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1. Krantz, J. C., Jr., and Carr, C. J.: The Pharmacologic Principles of Medical Practice, Baltimore, The Williams & Wilkins Company, 1958, p. 843.

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# *Alaska Medicine*

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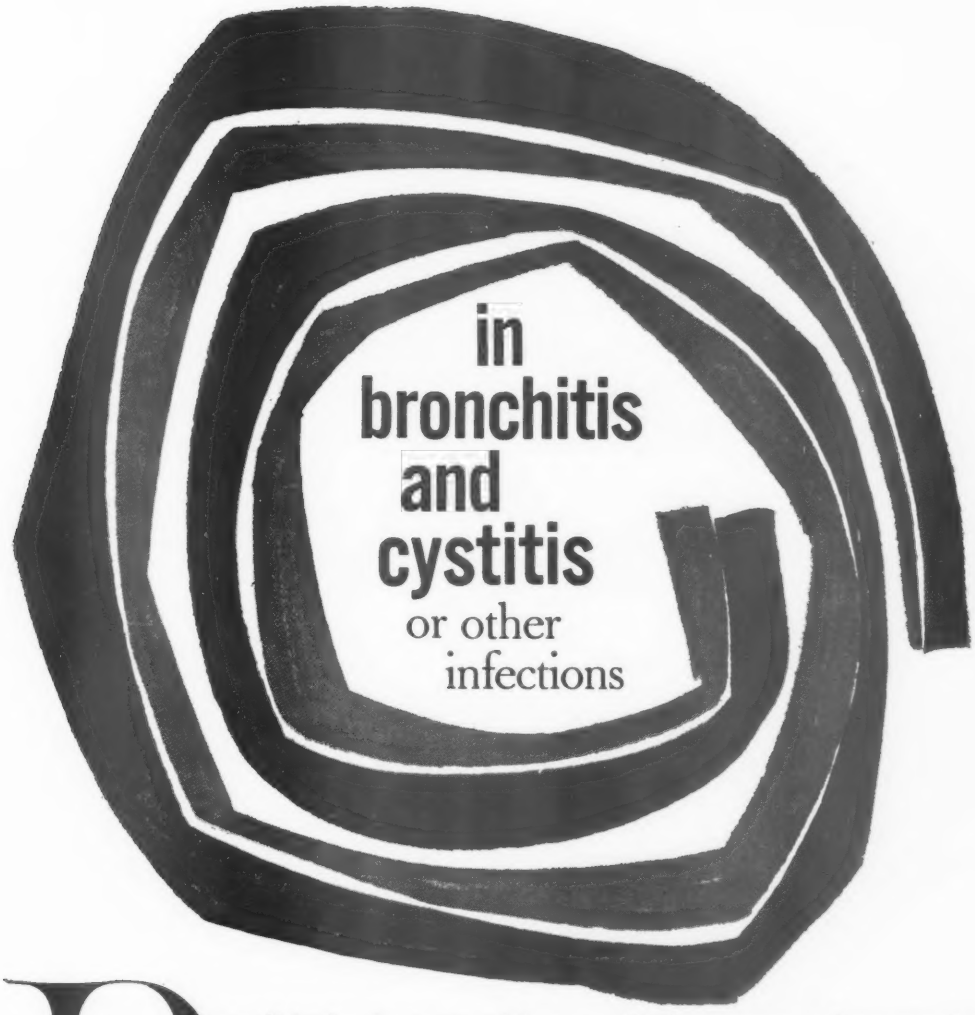


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1. Johnson, J. F.: Paper presented at Symposium on Blood, Wayne State University, Detroit, Michigan, Jan. 18, 1957; cited in M. Science 1:33 (Mar. 25) 1957; Proc. Soc. Exper. Biol. & Med. **94**:92 (Jan.) 1957. 2. Published and unpublished case reports, Ayerst Laboratories. 3. Rigg, J. P.: Digest Ophth. & Otolaryng. **20**:28 (Nov.) 1957. 4. Rigual, R.: Ibid., p. 3. 5. Servoss, H. M., and Shapiro, F.: Ibid., p. 10. 6. Menger, H. C.: J.A.M.A. **159**:546 (Oct. 8) 1955.

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# MODERN MANAGEMENT OF BACTERIAL ENDOCARDITIS*

*PAUL S. RHOADS, M. D.,*

*Professor of Medicine, Northwestern University Medical School*

*and*

*Chairman, Department of Medicine, Chicago Wesley Memorial Hospital, Chicago 11, Illinois*

To my surprise search of the records of Chicago Wesley Memorial Hospital revealed only 24 cases in the past five years in which the clinical or autopsy data were sufficiently convincing to establish the diagnosis of bacterial endocarditis (Table 1). Surely the incidence of this disease must be on the decline. Even this small group, which may not represent the actual incidence in our hospital, is sufficient to suggest present trends and problems, since these are quite similar in all respects to those published in several other recent reports.

### Diagnosis

Proper treatment depends upon a specific, complete and prompt diagnosis. It is now recognized that in anywhere from 10 to 20 per cent of the reported cases in which the diagnosis was made on adequate clinical grounds or autopsy findings, repeated blood cultures were negative. However, several blood cultures usually should be made before one starts antibacterial therapy. Kellow and Dowling (1) recommend three specimens of blood for both anaerobic and aerobic cultures taken at intervals of two hours on the first day. Others (2) advise repeating of this procedure carried into the second day if there is no growth in the media in 24 hours. Cultures should be observed for two to three weeks before they are discarded.

Bacterial endocarditis should be strongly suspected in all persons with unexplained fever who have evidence of valvular heart disease due to rheumatic fever or arteriosclerotic heart disease, or who have congenital cardiac defects, or who have recently undergone heart surgery. In elderly, debilitated patients suffering from chronic urinary, respiratory or skin infections, or in narcotic addicts who introduce drugs directly into their veins, endocarditis should be suspected if there is fever otherwise unaccounted for. Highly virulent micro-organisms such as hospital strains of staphylococcus aureus may implant themselves on valves not previously damaged. The presence of unexplained anemia and signs of embolism, such as petechiae of the skin; mucous membranes and conjunctivae; Osler's nodes; microscopic hematuria transient mental disturbances; headaches; and paralyses strengthen the suspicion of endocarditis. Friedberg (3) goes so far as to consider the presence of underlying heart disease and unexplained fever even in the absence of a positive blood culture or embolic signs as sufficient evidence to warrant treatment for endocarditis. Like others (4), he points out, in justifying this position, that both mortality and morbidity in bacterial endocarditis are increased by delay in treatment.

**TABLE I**

**BACTERIAL ENDOCARDITIS AT WESLEY HOSPITAL (1955-60)**

| Micro-organism | Recovered | Died |
|---|---|---|
| Streptococcus Viridans | 10 | 1* |
| Streptococcus Anhemolyticus | 1 | |
| Streptococcus Faecalis | 2 | 1* |
| Pseudomonas Aeruginosa | | 2 |
| Staphylococcus Aureus | | 1 |
| Staphylococcus Albus | 1 | |
| Negative Blood Cultures | 2 | 2† |
| No Blood Cultures | | 1‡ |
| | 16 (67%) | 8 (33%) |

* Both patients afebrile for 2 weeks before death.
1 died of congestive failure.
1 died of cerebral thrombosis.

† Autopsy Cultures: E. Coli; B. Proteus

‡ Autopsy Culture: Streptococcus Viridans

*Presented at the Alaska State Medical Association meeting, Sitka, Alaska, May 1961.

### Treatment

Of primary importance is the fitting of antibacterial treatment to the problem at hand. In most instances this can be delayed until the blood culture results are recorded at 24 or 48 hours. If they are negative at this time, or if a delay of 24 hours to wait for the first set to be completed appears hazardous one should proceed on the assumption that a non-hemolytic streptococcus is the etiologic agent, since 85 to 90 per cent of subacute bacterial endocarditis cases are caused by this micro-organism.

Since the sensitivity to penicillin of the supposed micro-organism is unknown the patient should be treated as if a relatively insensitive streptococcus were present. This would mean a daily dose of at least 20,000,000 units of penicillin parenterally each day along with 1.0 gm. of streptomycin intramuscularly every 12 hours at the start, with a change to 1.0 gm. daily after one week.

When the blood culture is positive—as will be present in the majority of cases—choice of the proper antibiotic and initial dosage is made after inquiry into the patient's past experience with penicillin and the other antibiotics up for consideration. In a patient who has had allergic reactions to penicillin some other antibiotic should be used, if at all possible. If not, initial therapy may begin with small doses of penicillin 0 intramuscularly (providing the patient's reaction in the past has been against penicillin G). If this is well tolerated a switch to the same drug intravenously may be tried if unusualy large doses are required, or a cautious trial of penicillin G may be made after the patient has received 25 mg. of Benadryl parenterally. Some physicians give probenecid orally in doses of 0.5 or 1.0 gm. every 12 hours to inhibit renal tubular excretion of penicillin and thus increase its blood level. Studies to determine the sensitivity of the micro-organism cultured from the blood against the appropriate antibiotics are always indicated. The tube dilution technic or the one in which the suspension of bacteria is streaked over the surface of agar plates containing various dilutions of the antibiotic are most useful.

### Alpha Streptococcus Endocarditis

In the past the great majority of cases of bacterial endocarditis were due to these micro-organisms; and this is still true, though the proportion is not as great as in the pre-antibiotic era.

When the bacterium is Streptococcus viridans or anhemolytic (gamma) streptococcus **not** of the fecalis strain, it usually will be found to be killed by 0.5 unit or less of penicillin per ml. of diluent. The blood concentration to be striven for should be five to 10 times greater than that indicated as the minimum bactericidal dose by in vitro testing. Against streptococci with sensitivity of 0.5 unit per ml. this optimum level can usually be attained with 4,000,000 to 6,000,000 units daily given intramuscularly in equally divided doses at six hour intervals. The preference of most physicians with experience in this field is for aqueous solution of penicillin G, though the reactions to aqueous emulsion of procaine penicillin G are only slightly more frequent. Bacterial endocarditis has been cured by large doses of penicillin administered orally (5) but the disease is too serious to warrant the routine use of this method.

If in the sensitivity tests more than 0.5 unit per ml. is required to kill the streptococcus the total daily dosage must be raised accordingly. Tumulty (6) has given a crude but useful rule of thumb, namely, that for each one million of units of penicillin given parenterally in divided doses each day, a concentration of about 1.0 unit per ml. of blood results. Thus, if the sensitivity were 2.0 units one should administer 10 to 20 million units of penicillin per 24 hours. Experience will reveal that dosages beyond 1.25 million units per six hours cannot be given intramuscularly without causing undue local irritation. Thus it usually becomes necesary to give larger doses well diluted intravenously in five per cent glucose in water, or physiologic solution of sodium chloride. Although doses up to 30 million units per day can be administered in as little as 1,500 ml. of solution, 2,000 to 2,500 ml. per day prove to be more satisfactory providing the patient maintains a good urinary output.

In the Wesley series of 12 patients, made up of 11 Streptococcus viridans cases and one with a gamma streptococcus, there was only one death. This patient died apparently of cerebral thrombosis after she had been afebrile nearly two weeks following treatment for SBE. In this group the penicillin dosage was 2,000,000 to 12,500,000 units per day in nine, averaging 6,000,000 units, and greater than 10,000,000 units daily in two. In

one patient the streptococcus proved to be resistant to penicillin in concentrations below 6.26 mcg. per ml. Hence a switch to Ristocetin was made.

On the basis of laboratory observations, Jawetz (7) classified antibiotics as either **bactericidal** or **bacteriostatic** (Table 2). He showed that members of Group I (bactericidal) used together could have either an additive or synergistic effect but usually synergism was observed. The combination of a Group I and Group II agent could result either in a simple additive effect or antagonism (e.g., penicillin and chloramphenicol).

The combination of streptomycin with penicillin apears to result in enhanced activity (8), hence streptomycin usually is added to the attack against streptococci in doses of 2.0 gm. daily to start out, then 1.0 gm. daily after a week. Certainly it should always be added if the streptococcus being combatted is not highly sensitive to penicillin.

Against highly sensitive streptococci penicillin treatment sometimes need not be given longer than two weeks. It is safer to continue treatment at least three weeks even if the patient is afebrile after the first three or four days. In the Wesley series the shortest duration of treatment was 21 days, the longest 49 days, the average being 32.3 days.

**TABLE II**
**SYNERGISM, ADDITIVE EFFECTS, ANTAGONISM**

**Group I—"Bactericidal"**

| | |
|---|---|
| Streptomycin | Neomycin |
| Penicillin | Ristocetin |
| Bacitracin | Vancomycin |

**Group II—"Bacteriostatic"**

| | |
|---|---|
| Chloramphenicol | Oleandomycin |
| Tetracyclines | Novobiocin |
| Erythromycin | |

Group I Plus Group I—Synergism.
Group II Plus Group II—Additive Effect.
Group I Plus Group II—Additive or Antagonism.

**Streptococcus Faecalis (enterococci) Endocarditis**

It is important to identify all streptococci by simple cultural methods because repeatedly it has been shown that most enterococci are much more resistant to penicillin than viridans streptococci. They may be recognized by their ability to grow in concentrated sodium chloride solution and to withstand heat (1). Authorities differ in their recommendations for treatment in these cases. Those who still feel penicillin is the best treatment recommend daily dosages of 20 to 60 million units together with streptomycin. Treatment usually must be for six weeks or longer.

Romansky (9) has had remarkably good results in enterococcus endocarditis with Ristocetin using a total of 1.0 to 6.0 gm. daily divided into two to four doses. Nine of his 10 patients survived. While the Wesley experience is limited, I am impressed with these results and recommend the method. The one death in the series of three treated at our hospital was in a patient who became afebrile only after receiving Ristocetin which was given in doses of 1.0 to 5.0 gm. daily over a period of 22 days. This patient finally died of congestive failure and renal insufficiency but the endocarditis appeared to be inactive at the time of death. This drug frequently causes troublesome phlebitis unless properly handled. It is best administered in doses of approximately 1.0 gm. in 50 to 100 ml. of saline solution within a period of 20 to 30 minutes every eight to 12 hours, depending on the total dosage required (average 25 mg. per kg. per day). A skin eruption, transient leucopenia, agranulocytosis, and fever may occasionally occur with its use.

**Pseudomonas Aeruginosa Endocarditis**

Strangely there have been two cases of Pseudomonas aeruginosa endocarditis proven by autopsy among the series of 24 cases considered here. One of these was reported in detail in 1958 (10). At that time a thorough search of the medical literature had discovered only 10 such cases, all of which had been fatal.

Since then 15 more cases of pseudomonas endocarditis have been reported, eight of which developed after surgery on heart valves. Two of these recovered after removal of infected granulomas connected with the Teflon or Ivalion patch used to repair an interventricular defect, at the first operation. A third recovered without a second operation after intensive intravenous treatment with Polymyxin B, oxytetracycline and gamma globulin (17). Three cases, which did **not** follow heart surgery were apparently cured by antibacterial treatment alone (18) in two and this method plus removal of the patient's infected spleen in another (19).

In the antibacterial therapy of pseudomonas endocarditis, Polymyxin B should usually be used to the limit of the patient's tolerance for the drug. Whether Colistin, a new antibiotic to which more than half of the pseudomonas strains are sensitive, will be equally effective remains to be proven. The new drug is worth a trial because it is much less toxic than Polymyxin B. Combination therapy should be used against this extremely resistant micro-organism.

Oxytetracycline and chloramphenicol more often than not will prove to be the best of the second agents to be used. Waisbren and Lepley (17) advocate the use of gamma globulin as a third agent to be used simultaneously in full doses even though the patient may have a normal amount of gamma globulin in his serum. The latter authors used all three agents, well diluted, intravenously though the intravenous route for Polymyxin B and gamma globulin usually is not recommended. They are convinced that the therapeutic efficacy was enhanced by this method and observed no deleterious side effects.

The usual dose of Polymyxin B for adults is 50 mg. every six hours, for colistin 100 to 150 mg. every 12 hours, and for gamma globulin 10 ml. daily.

Since Polymyxin B is quite irritating, we have introduced 1.0 ml. of 1.0 per cent procaine into the buttock through a two inch needle, then leaving the needle in place for a minute or so, introduced the Polymyxin B in 1.0 to 2.0 ml. of diluent. This does not completely eliminate the pain of the injection but, at least, postpones it for a time and makes it less intense. During administration of Polymyxin B and the other drugs which often should be given in full doses with it, frequent urinalyses, tests of the blood for azotemia, and observation for the development of paresthesias, deafness and tinnitus must be made.

### Staphylococcus Endocarditis

When the staphylococci are discovered in blood cultures the question of whether this denotes actual infection or contamination nearly always comes up. The desirability of taking several blood cultures on the first two days in which the diagnosis is entertained is pointed up by this ever-present problem. Many reports of unquestioned endocarditis due to Staphylococus albus have dispelled the impression held by some clinicians that this micro-organism seldom implants itself on the heart valves. Fortunately it usually causes a more benign infection than its yellow tinted relative. Without exception bacterial sensitivity studies must be performed when dealing with staphylococcus endocarditis.

If the staphylococci are sensitive to penicillin —as may be the case in possibly 40 per cent of instances—full doses of this drug, seldom less than 40 million units per day, together with streptomycin, 2.0 mg. per day at the start, usually are administered. Because staphylococci seldom will be found to have gained resistance to chloramphenicol some physicians prefer to use it as the other part of the combination rather than streptomycin. The treatment should be carried on, at least, six weeks in cases of coagulase positive hemolytic Staphylococcus aureus endocarditis. When the albus strain is responsible less intense and less prolonged treatment may be necessary.

In the majority of cases the micro-organisms will be found not sensitive to penicillin even in relatively high concentrations. In such instances vancomycin usually will be the drug of choice. It is given in doses of 1.0 to 5.0 gm. daily, the average dose being 2.0 gm., divided into 0.5 gm. doses administered intravenously at six hour intervals, according to the same routine outlined for Ristocetin. In our experience the most troublesome side effect of this drug is chemical thrombophlebitis, though the possibility of drug fever, renal damage and effects on the hematopoetic tissues must be kept in mind. For patients not responding to vancomycin some authors (12) have recommended bacitracin in doses of 20,000 units intramuscularly every six hours for adults. While this is very effective treatment, deleterious side effects, particularly on the kidneys, are almost certain if treatment is prolonged more than 10 days. Kanamycin is a somewhat safer, but often less effective, drug in case thrombophlebitis or

---

**ENDOCARDITIS DUE TO GRAM NEGATIVE BACILLI**

Rx Depends on Sensitivity Tests.

Combination Therapy Usually Indicated.

Common Combinations:

**B. Proteus**—Streptomycin + Chloramphenicol or Novobiocin.

**Aerobacter or E. Coli Group**—Streptomycin + Chloramphenicol or Tetracycline.

other cause makes it imperative to stop vancomycin. The greatest hazards with it are eighth nerve involvement and renal damage.

**Endocarditis Due To Gram Negative Bacilli**

In these cases choice of treatment must rest in large measure on results of sensitivity tests. Combination therapy from the start usually is indicated. If at all possible at least one bactericidal drug should be used, which against this group usually will be streptomycin. Against B. proteus, the most efficacious antibiotic will most often prove to be chloramphenicol, but the mirabilis strains may be sensitive to novobiocin. If chloramphenicol is used the dosage for adults usually should be 4.0 gm. daily intravenously, divided into four equal doses, at the start. As is well known, careful watch of blood counts must be made when this drug is used in full doses. After the fever comes down dosage may be reduced to 2.0 to 3.0 gm. daily by mouth.

In the case of E. coli or Aerobacter aerogenes endocarditis the same drugs usually are most useful though tetracyclines may be as effective as chloramphenicol. Full oral doses may be substituted for the intravenous or intramuscular routes after a few days.

In our own experience bacterial endocarditis due to Gram negative bacilli frequently is unsuspected. Often middle-aged or elderly persons with other easily recognizable conditions which have been thought to account for the patient's whole clinical picture, will be found late in their course or at autopsy to have endocarditis also (13). Most often the condition is associated with uncured pyelonephritis and advanced cancers of the pancreas or gastro-intestinal tract. Both the B. proteus and E. coli endocarditis cases of the Wesley series were diagnosed by culture of the heart valves at autopsy in elderly persons with chronic rheumatic valvular disease and chronic pyelonephritis, one of whom also had carcinoma of the pancreas.

**ENDOCARDITIS DUE TO STREPTOCOCCUS VIRIDANS OR ANHEMOLYTICUS:**

| Sensitivity Penicillin (Units) | Daily Dose Penicillin (Units) | Route of Penicillin Rx | Streptomycin As Added Rx Intramuscular | Approximate Duration of Treatment |
|---|---|---|---|---|
| 0.5 or Less | 4- 6 M. | I.M. | | 3 Weeks |
| 0.5- 2.0 | 5-20 M. | I.V. | 2 Gm.-1 Week, then 1 Gm. | 4 Weeks |
| 2.0-10.0 | 20-60 M. | I.V. | 2 Gm.-1 Week, then 1 Gm. | 4-6 Weeks |

**ENDOCARDITIS—BACTERIUM NOT IDENTIFIED:**

| | | | | |
|---|---|---|---|---|
| | 20-30 M. | I.V. | 2 Gm.-1 Week, then 1 Gm. | 4-6 Weeks |

**ENDOCARDITIS DUE TO STREPTOCOCCUS FECALIS:**

| Sensitivity Penicillin (Units) | Daily Dose Penicillin (Units) | Route of Penicillin Rx | Streptomycin As Added Rx I. M. | Ristocetin as Alternate Rx I. M. | Approximate Duration of Treatment |
|---|---|---|---|---|---|
| 1- 2 | 10-30 M. | I.V. | 2 Gm.-1 Week, then 1 Gm. | 1-2 Gm. | 4-6 Weeks |
| 2-10 | 30-60 M. | I.V. | 2 Gm.-1 Week, then 1 Gm. | 2-3 Gm. | 4-6 Weeks |

**ENDOCARDITIS DUE TO STAPHYLOCOCCUS AUREUS:**

Same Rx as above if Sensitive to Penicillin.
If Insensitive—Vancomycin in doses of 1-4 gm. daily I.V.

### Pneumococcus Endocarditis

The outlook in this disease is altered greatly by the associated conditions such as extensive pneumonia or meningitis which may be present. Since pneumococci have not gained resistance to penicillin through the years, sensitivity tests are unnecessary. Full doses of penicillin, seldom less than 30 million units in 24 hours, should be administered intravenously. If there is accompanying meningitis, sulfasoxizol (Gantrisin) or sulfadiazine in doses of 8.0 to 12.0 gm. daily, also intravenously, should be used. Even with this strenuous treatment the prognosis in pneumococcus endocarditis is quite uncertain.

### Beta Hemolytic Streptococcus Endocarditis

This disease has not been observed at Wesley Hospital in the last 15 years. When it does occur it is a serious infection, but one in which vigorous penicillin treatment, in doses of 10 to 20 million units daily usually is efficacious.

### General Measures

Most patients with bacterial endocarditis die of congestive cardiac failure, cerebral embolism, or chronic embolic and toxic nephritis—or combinations of these conditions—rather than sepsis per se.

Factors affecting prognosis unfavorably are delay in treatment; advanced chronic heart disease resulting in decompensation and auricular fibrillation; presence of other serious debilitating conditions such as anemia, diabetes, chronic active renal or respiratory infection, collagen disease, etc. Proper treatment of these accompanying conditions is of importance equal to planning a proper antibacterial program. Patients with cardiac decompensation should be limited to 1.0 gm. of sodium daily in the diet, fully digitalized using the digitalis prepartion with which the physician has had the most experience, and started on diuretics such as chlorothiazide or mercury, or both.

Tumulty (6) has pointed out that if fever fails to disappear after a few days of therapy, or if it recurs during management, several possibilities must be considered. The antibiotic used may have been incorrectly chosen or given in inadequate doses; the patient may be having drug fever from his antibiotic; thrombophlebitis may have occurred at the injection site; some intercurrent infection may be present; or rarely there may have been reactivation of some underlying disease process, such as systemic lupus or rheumatic fever.

When considering all of the above possibilities it sometimes becomes necesary to discontinue antibiotics for 48 hours; so that more blood cultures may be taken and the effect on the temperature of stopping therapy may be observed. It is seldom that the risk of such a step outweighs the benefit to be gained.

If endocarditis patients harbor infected teeth or other foci—one of which may have been the atrium for the blood stream infection under treatment—such foci should be removed while the patient is still receiving full doses of antibiotic, but after the patient has been afebrile, at least, two weeks.

### Prophylactic Treatment

In the Wesley material, which we reported 10 years ago, tooth extraction was found to have preceded the first recognized features of bacterial endocarditis by one to two weeks in slightly over 20 per cent of cases (14). Others have reported closely similar percentages. It is known that tonsillectomy (25 per cent in our own series (15)), instrumentation of the urinary tract, and gynecological operations may also result in temporary bacteremia in which the micro-organisms may implant themselves on heart valves if there has been previous valvular damage. Hence patients undergoing any of these procedures should be protected with penicillin at the time of operation or instrumentation. 250 mg. four times daily, orally or 600,000 units a day intramuscularly of penicillin the day before operation and continuing 24 to 48 hours into the post-operative period should be adequate.

### Summary

The diagnosis should be made promptly but, except under unusual circumstances, antibacterial therapy should be delayed until six blood cultures have been made. If the patient has unexplained fever and previous valvular heart disease —particularly if embolic features are observed— he should be treated for bacterial endocarditis even if the blood cultures are negative in the space of 48 hours. Antibiotic therapy, selected on the basis of the blood culture results, should be started at the earliest possible moment but modified,

if indicated, on the basis of sensitivity tests of the causative micro-organisms. It should continue three to six weeks usually, depending on the micro-organism being combatted and the patient's response. Unless there is allergic sensitivity to penicillin, this drug is the antibiotic of choice for those cases of subacute bacterial endocarditis due to alpha and gamma streptococci, staphylococci (if sensitive), pneumococci, and hemolytic streptococci. For most cases, streptomycin should be used in conjunction with it. In enterococcus endocarditis, Ristocetin is often the antibiotic of choice. In staphylococcus endocarditis, when the micro-organisms are insensitive to penicillin, vancomycin usually should be used.

Congestive cardiac failure and antecedent conditions such as chronic pyelonephritis, chronic respiratory infections and carcinoma must have proper treatment along with the antibacterial attack. Active foci of infection, particularly infected teeth, should be removed while the patient is still receiving full doses of antibiotic.

Any person with valvular heart disease who is to undergo tooth extraction should be protected by penicillin at the time of the extraction.

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# FROSTBITE:

## Experience with Rapid Rewarming and Ultrasonic Therapy

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*ANCHORAGE*

**PART III (See Dec., 1960)**

From review of the data in Part II†, it is apparent that the elimination of freezing injury is improbable. A decrease in incidence is possible, with proper prophylaxis. General knowledge of proper clothing, especially hand and foot gear, and care and use of such gear when in freezing temperatures is essential. Basic information regarding the mechanism of heat production and loss, resulting from the effect of activity, fatigue, sweating, shivering, wind exposure, and wet clothing, should be made available to winter travelers in the Alaskan area.

Methods of care in the event of unavoidable trauma to the person should be taught those whose occupation or avocation permits exposure in the Arctic or sub-Arctic. Neither here nor elsewhere has a solution been found nullifying the effect of neglect, carelessness, alcoholic intoxication, accident or assault that were contributing causes in this series.

Regardless of cause, it is interesting that only six of our fifty-one subjects were persons not oriented or acclimatized to Arctic or sub-Arctic conditions. Most of our severe injuries occurred in lifetime or longtime residents of Alaska.

The effect of possible training and conditioning on resistance to cold injury is still a highly controversial subject. In this respect, the relative paucity of cases of hand injuries among Native peoples here in Alaska is striking. Longtime Caucasian residents in the Alaska wilderness, as well as the Native people, traditionally utilize the hands fishing and working in the cold to a greater extent than urban dwellers and military personnel.

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†Parts I and II of this paper were published in March and December, 1960.

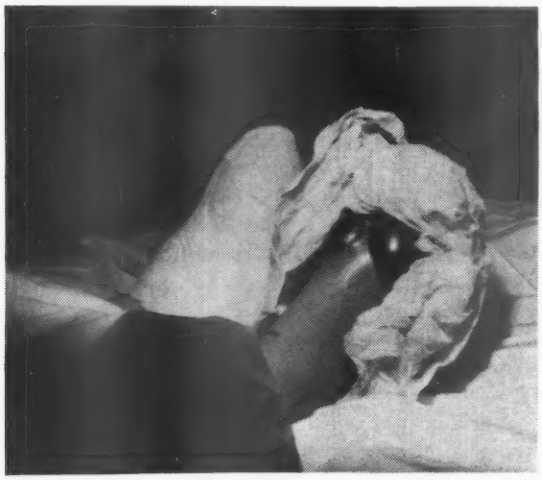
The construction of Native fur clothing is such that heat control of the body is quite difficult by removing or adding clothing. Temperature regulation often is accomplished in the Eskimo and Indian, by the removal of gloves, even in subzero weather, and the utilization of face and hand circulation as a heat radiator. The work of Irving, Nelms, and Ellsner[1] has demonstrated the greater ability of the Arctic Indian to perfuse his hands when subjected to cold exposure. He is able to achieve hand vasodilation more rapidly after cold stress, to achieve a much higher flow rate, and to sustain it despite general body chilling, in differences that are marked over the normal white control subject.

The difference is such that these people are able to work continuously for long periods with hands in water at freezing temperatures during their winter fishing or other activity, without obvious incapacity. Whites living a similar existence demonstrate an ability in this respect intermediate between the two groups mentioned. It is worthy of note that the Eskimo does not acclimatize his foot circulation in similar fashion.

In many patients the onset of freezing was apparent and gradual. A number of patients were aware of the danger besetting them, but were forced to choose between extremity freezing and survival. In some with associated injury to head, trunk or limb, no choice was available. Only great determination to survive, or opportune discovery, prevented eventual death from general hypothermia.

The initial treatment of freezing injury, as in any trauma, is one of first aid. Superficial skin involvement may be treated by warming the frozen part (especially head and face area) with a warm hand. Feet and hands may be warmed by contact with skin under protective clothing, and gloves and footgear may be changed or dried. Shelter, if available, resolves many of these problems.

In cases of severe frostbite occuring on the trail, it is our impression at present, that the limb may best be left in its frozen state until rescue is performed, or shelter obtained. At that time, more definitive care, particularly rapid rewarming in a water bath, may be offered. There is good cause to feel this is proper.



*Fluff dressing under adhesive gauze, for transport. Blebs still intact after 24 hours of travel.*

Travel may be possible on a frozen foot, or feet, that remain so, and survival may depend upon this. After thawing, travel is difficult, if not impossible, on the extremity that is swollen, painful, hyperemic and blistered. If further travel is necessary, after thawing, in the same freezing environment, the danger of re-freezing is likely, and seldom is the result other than disastrous. Severe tissue loss in a recent Mt. McKinley climber, not included in this series, appeared due to a freezing injury, following by thawing, and then on further ascent, re-freezing.

Inspection of Table I of this paper will demonstrate that the total duration of freezing is not correlated with the final degree of injury, and may indicate that the final result is less a function of duration of freezing and more a function of method of thawing, particularly rapidity of thawing, or rewarming.

Our data is not conclusive on this point, but highly suggestive, and as more cases accumulate, this problem will be given much attention. It appears that little is lost by permitting the extremity to remain frozen or cold, if rewarming may be anticipated in the reasonable future.

## Thawing Methods

Our data seems clearly to indicate that the use of dry heat is hazardous because of the danger of raising tissue temperatures above the limit of viability, especially tissues previously traumatized by excessive cold. Aside from this, superficial injuries can be treated by most any method with apparently reasonable good results. At least no great difference in result was demonstrated in this small series, other than a definite earlier return to normal sensation and appearance, in the extremities rapidly rewarmed in a water bath.

Following deep injury, our best results were obtained in those cases rewarmed in a water bath, as described. This method is more painful in its initial stage, resulting in increased hyperemia and larger blebs or bullae. The pedal pulses often are "pounding," after warming, and the blebs usually extend distalward to include even the terminal phalanges. Because of the extreme reaction, particularly the edema and bleb formation, this is not a "trail therapy."

Although results from 'gradual thawing' or thawing at room temperature in superficial injury appear not different statistically from other methods, there is obvious evidence clinically in the 'deep injury' cases, that this method yields poor results, often associated with considerable tissue loss.

The treatment of deep frostbite by ice, ice water immersion, or snow, plainly results, even

*Deep freezing injury, 24 hrs, post rapid rewarming, early bleb development.*

in this small series, in greater tissue loss. It appears to have little theoretical or experimental basis to recommend it. It is likely, we feel, that this traditional method arose from, first, the lessened pain and discomfort in this method of thawing, particularly in superficial injury, and from obviously disastrous results of the application of external dry heat.

This effect of excessive dry heat probably accounted for the severe gangrenous results reported by Larrey during Napoleon's retreat from

*Effect of excessive dry heat, 98 days post injury.*

Moscow, a report so often quoted in the cold injury literature, that rewarming at temperatures greater than body temperature was for many years rejected, and only recently received encouragement from the published work of Aryev [2], Crismon and Fuhrman [3] and Meryman [4].

### General Management

Prior to thawing, transport of the individual or handling of the frozen extremity is ordinarily not a problem. The limb itself is splinted by cold and requires only that tight gear be loosened. If thawing has occurred, the part may be covered with loose fluffs, surrounded by adhesive gauze, or elastic dressings to prevent bleb rupture. If none of these dressings are available, then transport is difficult. The friable, edematous tissues, covered often with blebs, may be injured during travel. Maceration and trauma to these tissues increases the risk of infection.

After recovery from general hypothermia, if present, and rewarming of the part, our patients began the previously described frostbite regimen. The initial examination is particularly important in the alcoholic, irrational, and often hypothermic patient. This patient is most difficult to manage, especially prior to return to the homeothermic state.

Management of the accident victim may become a problem in therapy, since frostbite often is secondary to dislocation or fracture or crush injury of the extremity. These cases present combined technical difficulties other than the method of rewarming and frostbite care, and as a group are desiring of more study. Treatment here is particularly directed to preservation of the peripheral vascular system.

Dislocations or fractures embarassing circulation by pressure must be reduced and placed in such alignment to prevent ischemia. Traction increasing vasospasm is obviously contraindicated. Open reduction in an area of frostbite is hazardous.

After placement of the cradle for the lower extremities or sterile sheets for the upper extremities, the patient is equally dependent for a good result upon capable and understanding nursing care. This is especially so when the gangrenous changes are advanced. The frostbitten extremity is not "pretty" and often repels both nurse and patient. Very cold or very warm liquids should not be in contact with the insensitive extremity, in order to avoid further tissue embarassment. Extremes of heat or cold may precipitate further gangrenous change. Control of infection, so ready to occur in these tissues, demands aseptic nursing technique. Clean gowns and masks are essential in the early edematous, hyperemic stages.

The irrational, alcoholic, or belligerent patient must be prevented from weight bearing, causing masceration of blebs and tissue contamination. In the event of absolute inability to control such a patient, and in one where techniques of restraint might be most difficult because of the involvement of the areas where restraints must be placed, we have found an Unna paste boot or even a light plaster cast over fluff dressings to be satisfactory

in the early stages. As soon as the patient is rational, these must be removed to permit a continuation of physiotherapy. Smoking is discouraged under this program.

A bright, cheerful hospital environment, ward area, or private room, is essential. Attendants and nurses must radiate confidence and render support. If deep or superficial gangrenous changes occur, with or without the associated odor, it is even more important not to set these patients away by themselves where they are unlikely to receive a normal degree of ward care and consideration. In fact, they require more care than most patients. Gentle handling of the extremities is necessary to prevent premature bleb rupture and tissue trauma or contamination.

We have found little promise in the use of vasodilators, anticoagulents, sympathetic block or sympathectomy in the early acute frostbite cases. Our own experience, however, is limited. Narcotic drugs have posed a considerable problem in the past. These patients often become dependent upon such drugs, even dependent upon the use of tranquilizing drugs. Few of them require sedation or analgesia after the first seventy-two hours. Much of their discomfort is the result of fear and concern. Most analgesic or narcotic drug therapy can be replaced by an encouraging bedside manner and a running explanation of the medical problem on daily rounds. It is essential that the attending physician and the nurses be patient and realize that, with adequate treatment and care, particularly after rapid rewarming, results will generally be much better than expected. As necrosis develops, and color changes become more marked, it is important to know that in all probability, fine epithelial tissues are growing below this superficial eschar. Little is lost at this point in delaying definitive procedures of any kind that are destructive of tissue. Often a pleasant surprise awaits both physician and patient when debridement is delayed or avoided, and physiological healing permitted.

**Whirlpool, Physiotherapy and Ultrasound**

Physiotherapy serves at least two purposes. First, its active use, quite important from a functional viewpoint, permits patient participation in the therapy. The patient may leave his bed for definitive care, thereby altering his environment. At least once a day travel to the therapy area may well be a considerable morale boost, particularly in the case of bedridden patients or those hospitalized for 30 - 150 days. The patient, too, is able to measure his progress by gradual increase in range of motion of the digits and the return of more normal sensation. Secondly, the use of whirlpool, with Hexachlorophene(R) detergent, cleanses the part of surface bacteria, and performs a physiological atraumatic debridement as well as permitting a stimulating massage of tissues. The difference in prevalence of severe infection in our series between those who did and did not receive whirlpool treatments is striking. There is little odor that so often is troublesome to these patients, following the use of whirlpool as compared with the patient who did not have this form of therapy. Whirlpool, too, possibly increases local circulation. It has, in our cases, appeared to cause rapid diminution of edema.

Pain is readily relieved after serial whirlpool. Patients, regardless of rewarming methods, tend to exercise the extremities while in whirlpool more than while lying in bed. Hand exercises, especially after the blebs have dried and sterile fluffs are utilized for pressure exercises (squeezing), are made easier and are more likely to be performed regularly during and after whirlpool therapy.

We have found ultrasound to be both help and hindrance. In cases of superficial injury, there is subjective evidence of benefit. Some patients report "improved" sensation and ease of interphalangeal joint motion. In several, assuming the cold injury to be nearly symmetrical in both extremities, with only one receiving ultrasound, there appeared a measureable change. Increased interphalangeal joint motion, and increased sensory return were marked. There was observed visual evidence of an apparent increase in vascularity of fingers and toes, particularly noted immediately after the use of ultrasound. With deep injury, or in the type of C and D results, there is cause to believe, from the sensation reported (boring pain, or dull ache), and from the appearance (hastened necrosis in some), that the use of ultrasound is harmful.

In some cases, after ultrasound, particularly those thawed by ice and snow and in a few, slowly warmed at room temperature, dry gangrenous tissues soon became wet. Liquifaction of the distal tissues was hastened in these. In further control groups, of approximate equal injury to each extremity, ultrasound has demonstrated its ability to cause resolution of the blebs many days

ahead of the opposite untreated extremity. At the third or fourth week, however, no difference was generally exhibited between those extremities.

### Debridement

From this study it is apparent that there exists no more traumatic therapy in cold injury than debridement. Mechanical rupture of the blebs converts the sterile field into a contaminated, potentially infected area. Incision of edematous and friable tissue permits ready access for bacteria, usually already present on the skin. From the gangrenous eschar, dry and wet, we have cultured in almost all our patients, staphalococcus aureus coagulase positive. The organism is provided a fertile culture media in these necrotic tissues. Too, incisions in these tissues, if carried too deep, will break through granulating epithelializing tissue below, and may result in further suppuration. Further, debridement or amputation in the early stages (first to third week) will penetrate the edematous tissues that then retract. More bone and joint surface is then exposed with further tissue loss.

*Premature debridement through wet, edematous tissues (52 days post injury) resulting in retraction of tissues.*

If amputation must be performed, it seems more proper to allow contracture and shrinkage of the tissues, with formation of a stabilizing granulation bed below at the demarcation site prior to the surgical procedure.

There may exist one area where debridement is beneficial if carefully performed. When the dry eschar in the resolving injury retracts and tightens, tissue necrosis below, or intrinsic muscle atrophy may develop. A fusiform digit or even loss of much of the digit may follow. If the eschar prohibits distal or proximal interphalangeal joint motion, a linear, volar or dorsal slit, even a bilateral digital slit may permit increased motion. This will provide, by increasing the range of motion, early shedding of the eschar, especially during whirlpool therapy.

Care in making these incisions must be utilized because of the underlying thin layer of new granulation tissue that is so readily penetrated and injured.

Debridement is adequately and physiologically performed by the whirlpool itself. The bath's gentle motion removes eschar as it is released from the epithelializing bed, only when it is physiologically prepared to separate.

### Infection

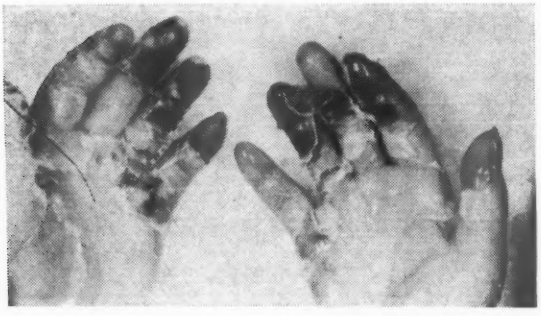
Superficial infection was present in most of our cases. Many demonstrated pockets of purulent material in the eschar. The superficial infection appeared held in abeyance by whirlpool, while increasing in many cases after debridement and without whirlpool.

For the first four years our patients were placed routinely on broad spectrum antibiotics. In the past year antibiotics were utilized only after definite indication and following culture and sensitivity studies. Their use was not essential in most patients utilizing whirlpool bath, but was more often required in patients treated otherwise.

Infection was found more often in those treated with occlusive dressings, not receiving whirlpool bath or daily lavage. It is presumed that the effectiveness of Hexachlorophene(R) in the bath was that of a germicidal agent, permitting constant topical application and was effective as prescribed because of its known property of reducing numbers of bacteria and interference with metabolism of pathogens as well as non-pathogens. It was used, too, as a prophylactic agent to decrease the incidence and severity of pyogenic skin infection. In our experience, only constant whirlpool followed by dry "open" technique will prevent the rapid growth of bacteria, particularly from the pockets of bacteria discovered on the gangrenous skin surface or the subcutaneous pools beneath the eschar.

### Amputation

The early appearance of the deep frozen extremity, once blebs have dried, is often that of a black mummified part, extending even above the digits and involving all of the extremity's surface. The overall appearance is often misleading. Amputation or debriding procedures at this period (6 - 21 days) may reveal viable deep structures, that would have permitted epithelialization under the eschar. Avoidance of premature amputation is essential. The eschar, after epithelialization, will often loosen and shed, permitting exposure of healing tissues below. If amputation must be performed, at the digital level, most satisfactory results appear to be at the sixty to ninety day period. The digits will, as all have seen, demarcate spontaneously, requiring only revision later. It is usually sufficient to remove the necrotic bone back to bleeding cortex or medullary canal, and permit the skin flap to fall over bone, utilizing then a small vaseline pack for three or four days. This may be held in place with one loose wire suture. Within seven days or even less, granulation has usually occurred that will permit further whirlpool therapy.



*Automatic debridement effect of whirlpool bath, with physiological separation of tissues.*

If, because of ascending infection, amputation must be performed at a higher level, it is absolutely esesntial to perform a strict Guillotine procedure. After edema has subsided and an adequate granular bed developed, revision of the stump can follow. All amputations were performed at extreme distal levels, to preserve as much tissue as possible. It is interesting to note that only one patient sustained amputation following rapid rewarming as described, and that resulted in loss only of a large toe.

### Associated Injury

Our experience with injury followed by secondary frostbite is similar to others. All cases of head, thoracic, abdominal or extremity injury must receive proper care, including restoration of

*Wet gangrenous change, thawed at room temperature (26 days post injury).*

general body heat and restoration of blood volume. Relief, if at all possible, must be provided the neurovascular deficit as early as it is recognized. The approach here is similar to that of an open fracture, where consideration is given first to preservation of life and limb, then function, and last of all, cosmetic result. Despite the glibness of this approach the problem is not that simple. Much clinical investigation is required to further the treatment of fracture dislocation or soft tissue injury of the extremity with associated cold injury.

Excluding patients whose psychotic reaction caused them to sustain cold injury as a result of deliberate exposure, or involuntary exposure unclothed, we are interested in the patient who becomes irrational or confused on the trail after freezing injury, and the bed patient who, after five or six days, demonstrates a severe emotional reaction, even developing hallucinations.

Langdon[5], interested in this problem, has described this reaction as a response in some to "a situational reaction of adult life, usually in indi-

viduals not prepared for the eventuality of frostbite." This reaction has followed the traumatic occurrence, usually in a remote, forbidding area, associated often with considerable danger, and fear of failure of survival. In many, a hypomanic reaction has occurred. Few of these patients required psychiatric care of any prolonged nature.

They did require understanding, tolerance of their mood, patience, and constant visitation and encouragement. It appeared helpful to discuss the changes that were occurring to their extremities. Those that thus became a part of the program (and they are an active participant) progressed more rapidly than others. One of our most reactive patients had considerable relief (and added much to our project) by using a recorder at frequent intervals at the bedside. Here he related, giving date and hour, changes in sensation and motion, or reaction to therapy, as these changes occurred. He gave us our best documented history of the occurrence of the injury, and discussed his reaction from initial onset through hospitalization to discharge. He was, upon release from the hospital, quite "expert" in cold injury, at least as involved his own episode.

*Exercise prognosis, against sterile fluffs, 36 days post injury, follow up Fig. A.*

Since it is important that the program be carried on without technique breaks, or premature ambulation, it has been found effective to have at least two physicians or a physician and nurse, in some accord, follow these patients. One to demand strict adherence to principles of treatment, and the other a buffer to explain the need for this discipline and to offer sympathy if the treatment becomes too demanding and rigid. This problem becomes obvious when one considers the helplessness of the patient with freezing injury of both hands and both feet (eight of our series) who for weeks and months are unable to bathe, feed themselves, grasp objects, or attend to any personal needs, including bowel or bladder function, without second party support. They are, as noted by Langdon, essentially quadriplegic because of injury to all four extremities, and may have episodes of hypomanic behavior together with outright fear, frequent irritability, and occasional depression.

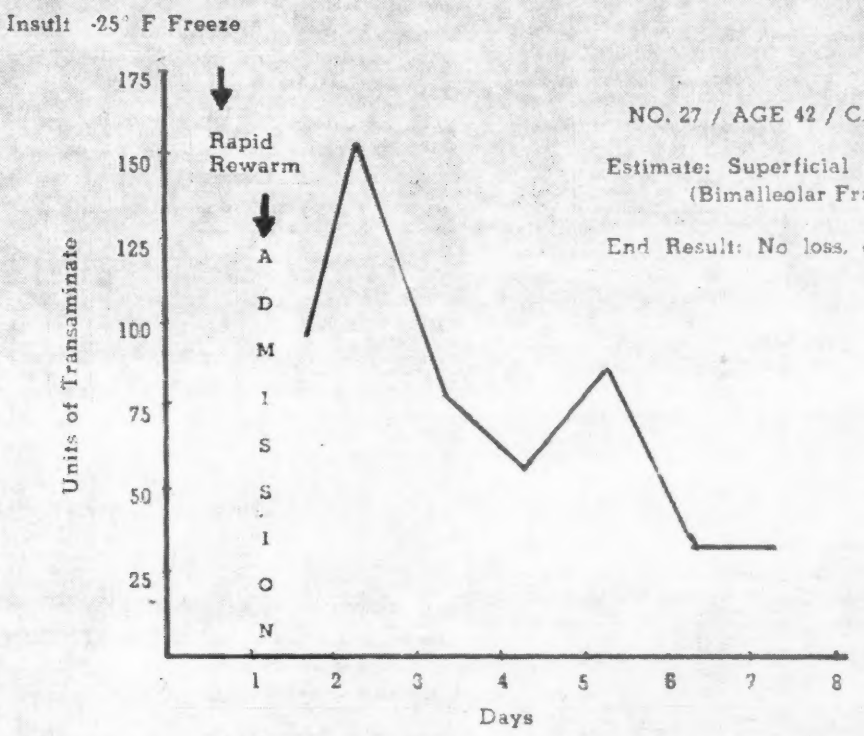
**Enzyme Studies**

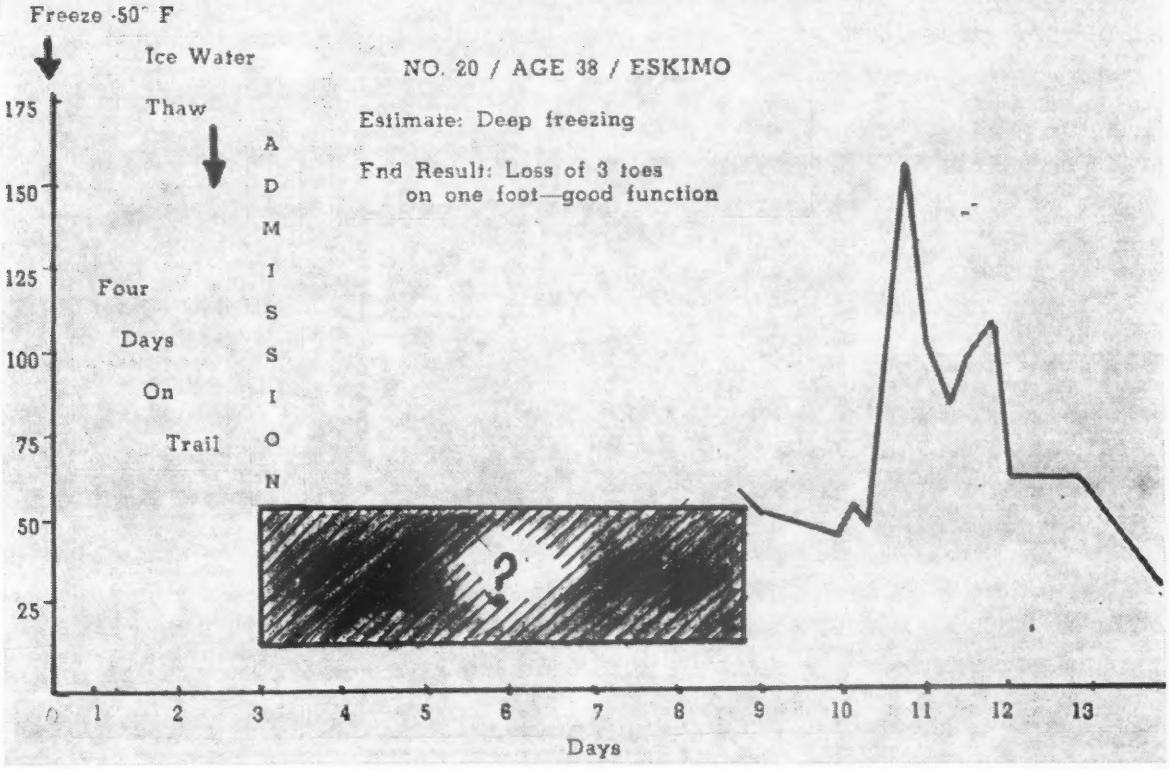
We have obtained standard enzyme determinations in our patients for the past two years. This portion of our project developed through an effort to demonstrate a pattern of vascular change in tissue trauma and repair during the period of rewarming and post re-warming. Too, we had originally proposed to seek a method utilizing alkaline phosphatase, lactic-dehydrogenase, serum glutamic oxaloacetic transaminase, and aldolase, as well as other standard enzymes, that would possibly provide a prognostic tool for early determination of definitive injury. This was primarily planned to provide the military field commander and medical personnel a tool for estimating disability in terms of availability for duty or priority for evacuation.

Some of the enzyme findings are quite interesting, and at this early stage appear to demonstrate, even with the non-specific enzymes, the following findings. There is a rapid rise and early fall in superficial injury or injury treated by rapid rewarming. These patients seldom have demonstrated any tissue loss.

Deep injury, treated especially by ice or snow pack or slow thawing, or rewarming at room temperatures, demonstrated a delay in enzyme rise, and a late fall that usually resulted in an anatomical pattern of marked tissue destruction. An interesting complication occurred in the plotting of enzyme levels when a combination of superficial injury of one extremity and deep injury of an-

## POST FREEZING SERUM TRANSAMINASE



other in the same individual was present. Then an early and late peak were demonstrated in the enzyme curve.

We have found, too, that in control subjects, with ultrasound an early rise occurs that evidently demonstrates tissue breakdown from utilization of ultrasound. When patients with deep injury were rewarmed by methods other than rapid rewarming, and had ultrasound as a part of their therapy, a dual peak occurred. Table I is presented, demonstrating a typical enzyme response in a patient who received rapid rewarming (#27) and one thawed utilizing ice and snow (#20).

### Radioisotope Studies

Patently, accurate, repetitive determinations of blood flow in cold-injured extremities could be invaluable in assessing degree of injury, prognosis and effects of therapy. Careful consideration of methodology suggested that radioisotope tracer techniques might well meet the problems of changing tissue resiliency, asepsis, and non-interference with arterial circulation, which practically exclude plethysmography, temperature measurement technique or angiography.

Throughout the past year pilot studies have been conducted to establish technique and to verify feasibility, utility, and safety. From studies on approximately twenty normal individuals it seems apparent that adequate counting rates can be obtained over the hand, fingers, forefoot, and toes.

Radioiodinated ($I^{131}$) hippuran was administered intravenously. Dosage was 2 uc/kg body weight, total dose varying from 100-160 uc. The rate of appearance and the equilibrium level of radioactivity in the extremity was measured with a collimated scintillation detector coupled to a precision ratemeter and rectilinear recorder for readout. Only the equilibrium levels could be considered reproducible. Radiohippuran was rapidly excreted and in 24 hours only tracer amounts could be detected in the thyroid establishing the low biological half-life of the compound.

It is apparent from the work of others that several times the dosage described can be used with safety. The introduction of $I^{125}$ into clinical use will reduce expense and shielding problems. It is therefore concluded that semiquantitative measurement of circulation in the distal extremities and digits can be made safely with the use of radiohippuran as described and that this method may be applicable to the problem of cold injury.

### Summary


1. Fifty-one cases of frostbite are presented, treated by varying methods, and thawed by diverse means. In this small series the results of rapid rewarming in warm water, by warm packs or by whirlpool bath at temperatures of 110 to 118 degrees Fahrenheit, appear to demonstrate the most satisfactory results.

2. Regardless of method of thawing or rewarming, the results are more satisfactory utilizing whirlpool therapy throughout the course of treatment to those not receiving whirlpool bath and other physiotherapy.

3. Ultrasound as a form of deep tissue massage appears beneficial in cases of superficial injury, and at this moment in this small series, appears not beneficial and probably harmful in deep injury.

4. Of great interest to us are the results of enzyme studies, cursorily reported in this Third Part, that appear to provide us an early estimate of depth of injury and tissue changes, and some inkling of the ultimate prognosis even long before the gangrenous changes occur.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# Editorial Page . . .

Those physicians and friends who attended the recent meeting at Sitka experienced every satisfaction. Accommodations were well planned, events were well organized, and hospitality in general was everywhere evident. Most importantly, the scientific program was well rounded, appropriately tailored to the audience and interestingly presented. The calibre of speakers was worthy of a medical meeting anywhere. Add to these features a friendly and attractive setting and weather which could only be classified as remarkable—you then have the 1961 Alaska State Medical Association meeting, one to be remembered.

Our warmest thanks to President McBrayer and all the others who worked so diligently and effectively to make it such a success.

We might also add that there seemed to be considerably more solidarity and unanimity, and considerably less factionalism at this meeting than some others, a sign we interpret as extremely hopeful for the medical profession in this State. The coming few years will be demanding of these qualities.

ROBERT D. WHALEY, M.D.
Editor

## FEDERAL EMPLOYEES HEALTH INSURANCE

In 1959 United States Government employees were offered broad prepayment health insurance under several plans. Coverage began on July 1, 1960. In Alaska a large majority of Federal employees elected insurance under a high or low option Indemnity Benefit Plan, administered by the Aetna Casualty and Surety Company, an affiliate of the Aetna Life Insurance Company.

Physicians generally have been pleased with the simplicity of the claim, the ease of billing and re-billing for follow-up care and the promptness of payment from the Portland, Oregon, Aetna Claims office. Customary professional fees for hospital care and surgery, office visits and outpatient laboratory and x-ray services are paid without question within the limit of a plan's liability, which in the case of physician charges, usually amounts to 75-80%. From the doctor's point of view, it is nice to know that payment of most of his charges is assured. It is only a minor annoyance to have to deal with the few beneficiaries who appear to have no intention of paying either the first $50 of charges each year or the 20-25% of charges not covered by the various plans.

One wonders, however, what the eventual cost experience with such broad coverage will be. Many essentially well individuals are reporting for complete office examination and testing who have never before been able to afford "luxury medicine." One wonders also whether such liberal coverage is leading to superfluous services by physicians.

In the long run, what may be the effect of such a plan? If costs skyrocket, employees may balk at mounting paycheck deductions. Or the Administration and Congress, in a burst of munificence, may improvidentially decide to underwrite all of the expense over and above nominal payroll deductions. If this occurs, we would all, as taxpayers, subsidize the program. Or, worst of all, the Government could decide to permit Federal employees to be treated in Government hospitals (as are high echelon Federal employees and their families now). This would predictably produce even higher costs because of the ponderous manner in which Federal hospitals are usually managed. If this occurs, another large segment of the population, which now includes military personnel and families, veterans, merchant seamen, Congressmen, and other government officials would no longer necessarily be responsible for their medical bills. Ultimately, if this trend persists and the physician works increasingly for a guaranteed payment from someone other than the patient, he will increasingly care less and less about trying to please each and every individual by serving him well. This is the heart of the fee-for-service doctor-patient relationship. When it is destroyed, much of the motivation to practice superior medicine will unfortunately but surely vanish and a new breed of physicians, interested more in regular pay and regular hours and less in the individual expression of his talents will have to be produced.

RODMAN WILSON, M.D.
Associate Editor

# Report From
# Division of Public Health
# Alaska Department of Health and Welfare

*EDWIN O. WICKS, M.D., Acting Director*
*ANCHORAGE and JUNEAU*

Over eighty interested participants attended the conference on "Long Term Patient Care" held on the University of Alaska Campus June 19, 20, and 21. More than forty hospital representatives and official agencies were represented and recommendations for long term planning were drawn up. The Honorable Francis X. Chapados, Chairman of the House of Representatives Finance Committee, participated as moderator of a panel discussion on "Financing Long Term Care". The seminar was made possible through use of Public Health Service special project funds and it is hoped that a similar meeting will be held during 1962. There was a conspicuous lack of private physicians in attendance and this was unfortunate as consultation on long term planning from this group of professionals would have been most gratifying.* Recommendations and seminar findings will be mimeographed and distributed soon.

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July begins the second month of the accident survey being conducted by the Alaska Division of Public Health. During last November more than 900 accidents were reported to hospitals in the State and it is expected that the month of July will produce nearly double this figure. It is hoped that the second month survey can be projected on an annual basis.

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Two reports have recently been received from the State of Hawaii Department of Health and should be interesting to those of you who work with cancer control. Reprints can be obtained by writing direct to Walter B. Quisenberry, M.D., Director, Division of Preventive Medicine. The articles are:

1. Controlling Cancer in a Community
2. Sociocultural Factors in Cancer in Hawaii.

* It was not made conspicuous to the Alaskan private physician that his presence was desired or invited, at this Public Health Service Seminar, financed by special project funds. (Ed. in Ch. Note)

It may be interesting to you that the Alaska Division of Public Health turned back to the Federal Government more than $40,000.00 of unused heart and cancer funds. This was due to lack of matching appropriations.

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According to the Public Health Service, the "Costly Time Lag" that results from failure to use new research finds costs:

1. Forty thousand cancer deaths which could be prevented each year.
2. Twenty thousand persons who die each year from preventable contacts from rheumatic fever and rheumatic heart deaths.
3. Sixty thousand new cases of tuberculosis each year, even though ways of preventing its spread are well known.

Single copies of publications which expand these facts are available free from the Public Health Service, Washington 25, D.C. The publications number is 813.

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The American Heart Association annual meeting and 34th Scientific Session will be held October 20 through 24th at the American Hotel, Miami Beach, Florida. The sessions look interesting.

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The Civil Defense Emergency Hospital has 200 beds, requires 18 M.D.s, 3 administrators, 33 R.N.'s, 5 anesthetists, 2 pharmacists and 118 aides. It can be set up in a school, community center or other building and has 8 basic sections: laboratory with 25 routine test capabilities, a stocked pharmacy, x-ray unit, OR with 5 tables, medical and surgical wards and expendable supplies for 48 hours, 15 KW power supply, emergency water supply, and records unit. 8,000 pieces of 290 items each are in 360 crates weighing 24,000 lbs., covering 2,000 cubic feet. One hundred and twenty manhours will erect the hospital on 15,000 square feet of floor space. Costing $26,000, one is stored at Seward, others are expected in the State.

# *Muktuk Morsels*

A COLUMN DEVOTED TO
MEDICAL NEWS IN ALASKA

*compiled by*
***HELEN S. WHALEY, M.D.***

WITH THE ASSISTANCE OF
EDWIN O. WICKS, M.D. *Juneau and Anchorage*
LAWRENCE I. DUNLAP, M.D. *Fairbanks*
JACK W. GIBSON, M.D. *Juneau*

## GENERAL NEWS

The fourth annual Alaska Heart Clinic, which is jointly sponsored by the Alaska Department of Health, Maternal and Child Health Division, the Alaska Heart Association, and the United States Public Health Service will start with clinics on Thursday and Friday, August 24th and 25th, in Fairbanks with Dr. Donald E. Tatum in charge. This will be followed by two to three days more of clinical evaluation of patients in Anchorage beginning Saturday, August 26th. Consulting specialists will be from the Presbyterian Medical Center in San Francisco, California and will include Drs. Frank Gerbode, heart surgeon; William Anderson, radiologist; Saul J. Robinson, pediatric cardiologist; and Arthur Selzer, cardiologist.

Several movies on open heart surgery will be shown. It is expected that A. A. G. P. credit will be given for the seminar session. Patients to be evaluated are primarily those with congenital or acquired heart lesions that might be benefited by more definitive diagnostic techniques such as cardiac catherizations; angiocardiography; etc. and heart surgery. Patients may be referred for evaluation through Dr. Tatum in Fairbanks and through Mrs. Evelyn Scott, Maternal and Child Health Representative, Alaska Department of Health office, 327 Eagle Street, Anchorage.

The Alaska Division, American Association for the Advancement of Science, is sponsoring the Twelfth Alaskan Science Conference, to be held at the University of Alaska, College, from August 28 to September 1, 1961. Scientific sessions will be held in the fields of Anthropolgy, Biology, Engineering, Fisheries, Forestry, Geology and Geography, Geophysics, Medicine and Public Health, and Social Sciences.

A survey of the present facilities and program and of the anticipated future needs of the various Crippled Children's Programs in Alaska was made by Dr. A. R. Shands, Jr., M.D., Medical Director of the Alfred I. duPont Institute of the Nemours Foundation, Wilmington, Delaware beginning July 8th for a two-week period. He was accompanied by Dr. William Hillman, Professor of Orthopedic Surgery, Vanderbilt University, who had previously visited Nome as a member of the Advisory Committee to the Maynard MacDougall Hospital. They reviewed the programs of the Alaska Department of Health, the Alaska Crippled Children's Association, The National Foundation, the Elks' Cerebral Palsy program, and other agencies, as well as studying the unique problems of both the native and white child living in isolated villages and small communities without special facilities. Sitka, Juneau, Fairbanks, Nome and Anchorage were visited.

An intensive three-day seminar on Aviation Medicine was sponsored by the Federal Aviation Agency in Anchorage on June 28, 29, and 30, primarily for designated medical examiners. The staff conducting the seminar were principally staff members of the School of Medicine at Georgetown University, Washington, D.C. Various aspects of cardiology, ophthalmology, otolaryngology, psychiatry, and neurology, as they relate to flying, were discussed.

On July 21 and 22 Dr. James M. Burnell, Clinical Assistant Professor of Medicine, University of Washington, School of Medicine, Seattle, gave a practical and intensive course on "Fluid and Electrolyte Balance" at the U.S.A.F. Hospital, Elmendorf, Alaska.

A refresher course on cancer of the uterine cervix was conducted by Dr. Paul A. Younge,

Assistant Clinical Professor of Gynecology, Howard University Medical School at the USPHS and U.S. Air Force Hospitals July 24 and 25. He was accompanied by Dr. Albert Kevorkian, Assistant in Gynecology, Howard University Medical School; Surgeon Free Hospital for Women and Dr. G. Howard Gowen, Cancer Control Program of the USPHS.

A comprehensive Mycology workshop was conducted by Dr. L. Ajello of the Communicable Disease Center, USPHS, Atlanta, Georgia on July 10 through the 12th. He also presented a resume of recent advances in Mycology to the Anchorage Medical Society on July 11th.

The Third Pediatric Neurology Clinic and Seminar was held in Anchorage on June 9th and 10th under the joint sponsorship of the Alaska Crippled Children's Treatment Center and The National Foundation in cooperation with the Anchorage Medical Society and the Alaska Chapter of The American Academy of General Practice with Dr. Margaret A. Jones, Associate Professor, Department of Pediatrics, University of California, Los Angeles, as the consultant. Approximately thirty children were evaluated. Movies on The Neurological Evaluation of the Newborn and the One-year-old Child were shown.

## LOCAL NEWS

KETCHIKAN: Dr. James Wilson successfully completed his boards in General Surgery. He presented a paper on Tumors of the Small Bowel at the State medical meeting in Sitka in late May. The Aviation Medical Seminar in Anchorage was attended by Drs. Ralph W. Carr and James Wilson.

Dr .Phyllis Smith is serving as Chief of Staff of the Ketchikan General Hospital for 1961-62. Bids have recently been let for construction of the new Ketchikan General Hospital. Dr. Arthur Wilson, another son of Dr. Arthur Wilson, Sr., is completing a residency in Internal Medicine at the Good Samaritan Hospital, Portland, Oregon.

SITKA: This community was the site of the Sixteenth Annual Meeting of the Alaska State Medical Association from May 24th through the 27th. An outstanding clinical session was organized by Dr. B. E. McBrayer, President, in cooperation with Dr. E. D. Spencer, President of the Sitka-Mt. Edgecumbe Medical Society, and Dr. Robert H. Shuler, Chairman of the Sitka committee on arrangements. Fishing, boating, a visit to the pulp mill and to several of the islands, as well as to the numerous historical points in Sitka, all combined with an unusual amount of sunshine, provided a unique setting for the medical meeting.

In July, Dr. Shuler attended the Aviation Medical session in Anchorage.

HAINES: The State Medical Society meeting was attended by Dr. Phillip H. Jones, who served on several committees.

JUNEAU: Two new internists are joining the Juneau Clinic. They are Dr. Henry Akiyama from the University of Oregon Medical School and Dr. Walter Totten, a graduate of the Dalhousie University, Nova Scotia, who has completed a residency at Stanford University in California.

Dr. William Whitehead is working part time for the present. Dr. Henry Wilde attended the Sitka medical meeting, and Dr. John Lesh the Aviation Medicine Seminar.

CORDOVA: Dr. Brown attended the Aviation Medical Seminar.

KODIAK: Both Dr. Bruce Keers and Dr. Bob Johnson continue very active in medical and community affairs. At present Dr. Keers is President of the P.T.A.; and Section Chief of the Ski Patrol. He attended the Sitka meeting and Dr. Bob Johnson the Aviation Seminar.

SELDOVIA: Dr. Russell Jackson is planning to leave this community and enter practice in California. Dr. Jack Fenger will be the nearest physician across Kachemak Bay at Homer.

SOLDATNA: The Aviation Seminar was attended by Dr. Paul G. Isaak. He will be joined in practice during July by Dr. Elmer Gaede, who served with USPHS in Anchorage and Tanana several years ago, and who has just completed a General Practice residency in Tulare, California. Dr. Gaede recently flew his Family Cruiser up and will return soon with his wife and four children.

DILLINGHAM: The Aviation Medical Seminar was attended by Dr. John Libby.

BETHEL: Dr. Harriet Jackson, who continues as Mayor of Bethel, recently helped inaugurate a new phone system for that community. She was also an attendant at the Aviation Medicine Seminar.

FAIRBANKS: Dr. Joseph M. Ribar, Mayor of Fairbanks, is the new President of the Alaska State Medical Association. He attended the American Medical Association convention in New York as the Alaska delegate. Dr. Donald E. Tatum is President of the Fairbanks Council of the American Heart Association and the President Elect of the State Association. Dr. Henry Storrs was an active participant at the State medical meeting. Dr. Arthur Schiable attended the Aviation Medical Seminar.

POINT BARROW: Dr. Ruth Coffin, an internist who has been with the Alaska Native Health Service for the past four years, recently completed her last assignment which was as MOC at Point Barrow. She plans to enter private practice in the Ventura-Oxnard area of Southern California.

SEWARD: Dr. Ernest Gentles attended the recent annual meeting in New York, of the American Trudeau Society.

CHUGIAK: The Sitka Medical Meeting and Pediatric Neurology Conference in Anchorage were attended by Dr. Marshall A. Simpson.

ANCHORAGE: Under the auspices of the EENT Foundation of Alaska, Dr. Milo Fritz accompanied by Mr. John Spahn, an optician, and Mrs. Elizabeth Fritz visited the villages of Beaver, Shageluk, Huslia, Allakaket, Stevens Village, and Venetie and performed approximately 150 tonsillectomies and adenoidectomies during June. They were aided by native volunteers in the villages. Sponsored by the American Cancer Society, the Alaska Division, Dr. Nancy Sydnam went into the same villages simultaneously and did approximately 270 complete histories and physical examinations to screen for cancer. She did approximately 102 Papanicolaou smears and is awaiting the final results. A number of patients with other conditions were referred into hospitals for follow-up.

Dr. Lawrence H. Winter was recently appointed the new Director of Tuberculosis Control for the Alaska Department of Health and Welfare and is stationed in Anchorage. He is a graduate of Stanford University and Stanford Medical School. His last assignment was with the Department of the Interior on American Samoa. Since his arrival he has spent considerable time making field trips.

A number of new physicians have arrived recently. Dr. Frederick Hillman, who served as the Assistant Chief of Surgery at USPHS Alaska Native Hospital in Anchorage for the past three years, will enter the private practice of surgery. He graduated from the University of Washington Medical School in 1950 and had his general surgery residency at the V.A. Hospital in Seattle with additional training in orthopedics and thoracic surgery. He is board certified. Dr. William J. Mills, Jr., will be joined by Dr. Donald Kettelkamp who has just completed his orthopedic residency at the University of Iowa. Dr. Kettelkamp was formerly with the USPHS in Anchorage and is a graduate of the University of Iowa. Dr. Thomas Kiester, a 1954 graduate of the University of Maryland, interned at the USPHS Marine Hospital in Baltimore. He was at Mt. Edgecumbe from 1955 to 1957 with the USPHS. From 1957 to 1961 he served an orthopedic surgery residency at the University of Louisville, spending the last year at the Kosiar Crippled Children's Hospital in Louisville. He will join the Doctors' Clinic as an orthopedist. Dr. Don Val Langston, a 1956 graduate of the University of Texas, Medical Branch, Galveston, served at the Ft. Richardson dispensary from 1957 to 1959. He has just completed a two-year pediatric residency with one year at the John Sealey Hospital, Galveston, and one year at the Children's Medical Center in Dallas. He will limit his practice to pediatrics.

Dr. J. Ray Langdon recently attended the Fourth Annual meeting of the Western Council on Mental Health Training and Research in Salt Lake City, Utah.

U.S. PUBLIC HEALTH SERVICE: Under the Commissioned Officer Training and Extern program, a career development program known as COSTEP, a graduate level medical and dental student has been assigned to the Anchorage USPHS Hospital for the three summer vacation months. Mr. Brian A. O'Hara, who has just completed his third year at the University of Washington Medical School arrived in June for this program. In addition there are two medical students assigned who have completed their second

year of training, who are rotating through the pediatric, medical and surgical services.

A number of physicians have left Alaska. These include Dr. J. Kenneth Fleshman, a former MOC at the Kanakanak USPHS Hospital, who was transferred to the USPHS Hospital at Whiteriver, Arizona. Dr. Charles H. Neilson, former MOC at Kotzebue, has been assigned to the PHS Hospital, Staten Island, New York for a three year residency in Radiology, where Dr. Glen B. VanAtta will serve as the Assistant Chief of Surgery. After seven years in Alaska, most of which time was spent at Kotzebue and Bethel, Dr. George N. Wagnon has been transferred to a new PHS Indian Hospital in Shiprock, New Mexico, which is a seventy-bed facility. Dr. Charles P. Tschopp has received an appointment in Otolaryngology at the University College of Medicine, Burlington, Vermont which has been sponsored by the USPHS.

New Chiefs of Staff at the USPHS Hospital, Anchorage include Drs. Joseph and Martha Wilson, formerly stationed at Mt. Edgecumbe; he will serve as Chief of Surgery and is a qualified Thoracic Surgeon; she is an Internist and will serve on the Tuberculosis Service. A new Chief of Ophthalmology is Dr. Charles S. Tannenbaum, a graduate of Harvard Medical School who has recently completed a residency in Ophthalmology at Bellevue Hospital in New York. Anesthesiology will be covered by Dr. Robert J. Alzner, a University of Oregon Medical School graduate who has completed a residency in Anesthesiology at that school.

U.S.A.F. HOSPITAL, ELMENDORF AFB: Lt. Col. J. Lewis Smith, a Thoracic Surgeon and a 1947 graduate of Vanderbilt Medical School, was transferred from USAF Hospital, Scott AFB, Illinois, where he served as Assistant Chief of Thoracic Surgery. A Cardiologist, Major Billye G. Gant, a 1953 graduate of Baylor University Medical School, was transferred to Elmendorf from Carswell AFB, Texas where he served as Chief of Medical Service at the USAF Hospital.

Board examinations were taken by the following physicians recently: Major Latimer H. Booth, General Surgeon - American Board of Surgery - Portland, Oregon; Major Frederick W. Wiese, Othopedic Surgeon - American Board of Orthopedic Surgery - Palo Alto, California; Capt. Raymond H. Mondshine, Pediatrician - American Board of Pediatrics - San Francisco, California; and Major David F. Wolter, Obstetrician - American Board of Ostetrics and Gynecology, Chicago, Illinois.

Medical meetings were attended by the following: Colonel William F. Patient, Alaskan Air Command Surgeon and Lt. Col. Arthur Ryan, Commander of the 5010th USAF Hospital, Eielson AFB, Colonel Levi M. Browning, Commander USAF Hospital, Elmendorf AFB and Capt. Kenneth N. Beers, Chief of Aviation Medicine attended the Annual Meeting of the Aerospace Medical Association, Palmer House, Chicago, Illinois from April 24 thru 27.

Maj. Ray E. Fitch, Chief of Air Force Clinic Branch and Capt. Kenneth H. Bleifer, Internist, attended the 42nd Annual Session of the American College of Physicians held at the Americana Hotel, Miami Beach, Florida from May 8 to 12. Capt. Bleifer also attended the Annual Meeting of the American Society of Clinical Investigation and American Federation for Clinical Research, at Atlantic City, N.J. from May 1 thru 4. Major David F. Wolter, Chief of OB-GYN, attended the National Meeting of the American College of OB-GYN in Miami, Florida from April 21 to 28.

Capt. Gerald B. Holzman, Ostetrician and Capt. John F. Batson, General Surgeon completed their duty tour. Capt. Dale R. Dunnihoo, Obstetrician, will continue his residency training at Barnes Hospital, St. Louis, Missouri.

## MINUTES OF THE 16TH ANNUAL MEETING OF THE ALASKA STATE MEDICAL ASSOCIATION

**May 24, 25, 26, 27, 1961**
**Sitka, Alaska**

**Members Attending:**

ANCHORAGE—Robert B. Wilkins, Robert D. Whaley, Helen S. Whaley, C. E. Chenoweth, John C. Tower, J. Ray Langdon, Rodman Wilson

SITKA-MT. EDGECUMBE—Benjamin E. McBrayer, Edward D. Spencer, Robert H. Shuler, Philip Moore, T. M. Moore

FAIRBANKS—Joseph M. Ribar, Henry G. Storrs

KETCHIKAN—Arthur N. Wilson, Dwight L. Cramer, Louis Salazar, James Wilson

JUNEAU—Edwin O. Wicks, Henry Wilde, Grace E. Field

EAGLE RIVER—Marshall A. Simpson

GLENNALLEN—Chester L. Schneider

KODIAK—J. Bruce Keers

HAINES—Phillip Jones

DILLINGHAM—John E. Libby

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The 16th Annual Meeting of the Alaska State Medical Association was called to order on May 24, 1961 at the Baranof Grade School, Sitka, Alaska by President Benjamin E. McBrayer.

After a few words of welcome, he introduced the Honorable J. Earl Sennett, Mayor of Sitka, and Mr. Charles W. Kidd, President of the School Board, Sitka Independent School District, both of whom extended a cordial welcome to the group from the City of Sitka.

Dr. R. R. Armstrong, President, Sheldon Jackson Junior College, Sitka, Alaska, welcomed the group to Sitka and gave a short talk outlining the program of the Sheldon Jackson Schools. He also extended an invitation to everyone present to visit the school and their museum.

President Benjamin E. McBrayer then addressed the group, reporting as follows:

"It is with a great degree of mixed feelings that I open this, the 16th Annual Meeting of the Association. Mixed feelings because I know that we have been successful in some ways but have made little or no progress in other matters. I personally have learned a great deal and I hope that I may in some small way be able to help out in the years to come. Many things need to be accomplished and they can be if we exert our efforts and activities to make them successful.

"I have been fortunate this year in being able to visit many of the doctors throughout the State and I am sure that I profited more than those with whom I talked. Fairbanks, Anchorage, Juneau, Ketchikan, Wrangell, Petersburg, Haines and Skagway were stops and in all of them I was impressed with the type of men practicing medicine in Alaska. I am sure we can say that the percentage of dedicated, sincere, professional men is high in our organization. In all places I visited it was evident that the care of individuals was the paramount reason for our existence. You may say, isn't that why we are here, and I must confess that throughout medicine there are many who put the almighty dollar in first place. That is not too evident in Alaska, in my opinion.

"I have had considerable correspondence and conversation with members of the Department of Health and Welfare, from Commissioner Winsor down to public health nurses in the villages. There we have some very sincere hardworking people, but not enough of them. The Department of Public Health and the Section of Mental Health both need professional personnel that can bring these departments to a position where they can function as they are needed. Don't get the impression I am criticizing those now in the department. I am not, but they need help, more professional personnel. Until we are able, working with our legislators to convince them that to get professional people of high caliber we must be able to pay for services rendered, we will not get far. If our present legislators cannot or will not see this, then let us work to elect those who will.

"I have worked since March 1960 in an attempt to get sanction and appointment of an Advisory Committee from our society to work with the Department of Public Health. In April I was told that this would be done before now, but about one week ago I received a letter from Commissioner Winsor which is somewhat confusing in that it does not say no nor does it say yes, but does include this comment: 'The very informality of such a professional advisory group does not lend itself to the type of professional advice which might work to the best advantage of the Department as well as the Society.' Mr. Winsor has promised to discuss that at this meeting. My thoughts of an advisory committee have been a group that will be a stopgap until we can convince the administration of this State that there are certain matters that can be best decided and acted upon by a State Board of Health made up of professional people, not only in medicine, but perhaps in law and education. That we must work for at all times.

"Legislatively, we have had little success, but at the last session of the Alaska Legislature we were not the only group that was unsuccessful. It is certainly not a healthy setup when a member of the Legislature can tell you before the session begins what matters will be acted upon and what will have no chance. That is true in Alaska as it happened to me. There are many fine men in our Legislature and I am sure they mean well. I am not so sure of their advisors. Many of them began to see the light in many of our problems and of other groups, but the pressure was too great and threatened revolt by some did not occur. I am sure the answers to this problem lies at the polls.

"I could go on at great length but I have said enough. I shall conclude by making a few recommendations which will lie in your hands at this meeting.

"First, I would like to recommend that this Association set aside in its annual budget a moderate amount of monies for use by the President. Travel, secretarial help, and other incidentals come high in Alaska and yet they are necessary if a President of our group is to know what other doctors in the State are thinking and would like to have done. It is easy to say writing will do it, but face to face conversation is more important. I hasten to say I do not wish to make this retroactive.

"Secondly, a competent individual should be employed by our Association to represent us during the Legislative sessions. This was considered this year, but I will take all responsibility for not doing so after talking with several people in the Legislature who told me that, in their opinion, it would be wasted money in this last session.

"Third, a thorough study of our Constitution and By-Laws should be made, particularly in respect to committee organizations. To fulfill all the requirements of the Constitution and By-Laws, plus the special committees made necessary by action of the last

annual session, the appointment of seventeen committees was needed. There are many other areas where advantageous changes may be made.

"Again, I would add more, but I feel these embody the most needs at this time.

"May I conclude by saying that I have enjoyed serving as your President this year. I have enjoyed the associations with you, collectively and individually. I hope that I have been able to contribute to the advancement of Alaskan medicine during this past year, and if I have I am amply rewarded for your confidence in me."

The President then made the following committee appointments:

**Nominating Committee:** Dr. C. E. Chenoweth, Chairman; Dr. Henry G. Storrs; Dr. Louis Salazar and Dr. Philip Moore.

**Resolutions Committee:** Dr. Arthur Wilson, Chairman; Dr. J. Bruce Keers; Dr. Chester L. Schneider and Dr. Edward Spencer.

**Budget Committee:** Dr. Dwight L. Cramer, Chairman; Dr. Marshall Simpson and Dr. J. Ray Langdon.

Mr. Paul Winsor, Commissioner of the Alaska Department of Health and Welfare reported to the group with a general outline of the present status and projected plans for the Alaska Department of Health and Welfare. His address was followed by a general discussion, mainly concerned with the problems of the Division of Mental Health.

President McBrayer then called for reading of the minutes of the 1960 convention and the Treasurer's report. With a unanimous vote of those present the reading of the minutes was dispensed with and the minutes approved. The Treasurer's report was read and unanimously approved.

The annual report of the Division of Public Health of the Alaska Department of Health and Welfare was presented by Dr. Edwin O. Wicks, Acting Director.

The meeting was then recessed, followed by the afternoon scientific program.

### Thursday, May 25, 1961

The entire day was devoted to the scientific program.

### Friday, May 26, 1961

The business session convened with a report from the Veterans Administration by Dr. Grace E. Field, and a report from the USPHS, Alaska Native Health Service, by Dr. K. Kasuga.

The minutes of the meeting of the Council held May 23, 1961 were read by Dr. Robert Wilkins, Secretary, and unanimously approved.

President McBrayer then called for reports of committees:

The report of the Nominating Committee was presented by Dr. Chenoweth, Chairman: For President-Elect, Dr. William J. Mills, Jr.; for Vice-President, Dr. Joseph B. Deisher; for Secretary-Treasurer, Dr. Robert B. Wilkins; for two year term as Councilor, Dr. J. Bruce Keers, Kodiak and Dr. Henry Storrs, Fairbanks; for a one-year term as Councilor, Dr. Edward Spencer, Sitka; for Delegate, Dr. Joseph M. Ribar; for Alternate Delegate, Dr. Robert D. Whaley.

President McBrayer called for further nominations from the floor. Dr. Chester Schneider was nominated for a two-year term as Councilor, and Dr. Benjamin E. McBrayer for Alternate Delegate. There being no further nominations a vote was called for and the following officers elected:

Dr. William J. Mills, Jr., President-Elect
Dr. Joseph B. Deisher, Vice-President
Dr. Robert B. Wilkins, Secretary-Treasurer
Dr. J. Bruce Keers, Kodiak, Councilor (two-year term)
Dr. Edward D. Spencer, Sitka, Councilor (one-year term)
Dr. Joseph M. Ribar, Delegate
Dr. Robert D. Whaley, Alternate Delegate

President McBrayer called upon Dr. Arthur N. Wilson, Chairman for a report of the Resolutions Committee. Dr. Wilson reported that 17 resolutions had been prepared for consideration of the body, and each member present was provided with a copy. He announced that additional resolutions would be presented at the meeting the following day.

After being duly moved and seconded, the following resolutions were passed unanimously:

RESOLUTION I

WHEREAS, the Alaska State Medical Association is a body of physicians and surgeons dedicated to maintaining the highest possible quality of medical care for the people of Alaska, and

WHEREAS, there are problems in Alaska relating to the epidemiology of cancer which are presently not being properly recorded and studied, and

WHEREAS, Alaska is a State which certainly will progressively obtain its true medical status among the remainder of the 49 States of our great country,

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association, in session assembled, approves the appointment of a committee within this body to investigate the establishment, availability of personnel and funds and location of an Alaska State Tumor Registry.

RESOLUTION II

WHEREAS, Senate Bill No. 3570 has been introduced in the United States Senate by Senator John S. Cooper of Kentucky, co-sponsored by Senators Bartlett and Gruening of Alaska and others, and

WHEREAS, this Bill implies that the present treatment of laboratory animals is not humane, which seems entirely unfounded in view of the consistent efforts at medical research centers to improve such care, and

WHEREAS, this Bill appears to be an attempt by the anti-vivisectionists to strangle medical research in red tape by (a) Requiring a license for every individual scientist who might work with animals under any Federal grant or contract; (b) requiring inspections of laboratories doing animal research and "Certificates of Compliance"; (c) requiring submission of research plans to the Secretary of Health, Education and Welfare, thus tending to limit the flexibility so essential in research projects; and (d) requiring annual reports of all experiments from each licensee; and

WHEREAS, this Bill would absolutely prevent Federal grants for research of certain types where it is required that an animal recover from complete anesthesia so that subsequent observations can be made;

BE IT THEREFORE RESOLVED, that the Alaska Medical Association, in session assembled, asks its proper representative in the Congress of the United States to take whatever action may be appropriate to oppose the passage of this Bill or any similar measure;

BE IT FURTHER RESOLVED, that this Association join the National Society for Medical Research, with a membership contribution of $50.00.

RESOLUTION III

WHEREAS, rabies has been prevalent in certain areas in Alaska;

BE IT THEREFORE RESOLVED, by the Alaska State Medical Association, in session assembled, that the State Division of Agriculture, which is charged

with the control of diseases in animals, including those transmissable to man, be supported in the positive control of rabies in pets by requiring suitable immunizations before importation of pets into the State or their continued location therein.

RESOLUTION IV

WHEREAS, in 1959 there was introduced in the House of Delegates Resolution No. 31 calling for the establishment of a Commission to Study the Relation of Medicine to Optometry and to report to the House of Delegates; and

WHEREAS, the House of Delegates caused to be established a sub-committee to Study the Relation of Medicine to Optometry under the then Joint Committee to Study Paramedical Areas in Relation to Medicine; and

WHEREAS, the original Joint Committee to Study Paramedical Areas in Relation to Medicine has been succeeded by the Committee on Relationships of Medicine with Allied Health Professions and Services; and

WHEREAS, optometrists are not ancillary to medicine, but are independent licensed practitioners and, therefore, do not constitute an allied health profession; and

WHEREAS, there exists confusion in the public mind as to the distinction between medical care for patients with ocular complaints and optometric services; and

WHEREAS, the lack of understanding in this area is a threat to the welfare of the patient;

BE IT THEREFORE RESOLVED, that the House of Delegates of the American Medical Association establish a Commission on the Relation of Medicine to Optometry, to be appointed by the Speaker of the House, at least half the members of which Commission shall be physicians practicing in the ophthalmological branch of medicine; and

BE IT FURTHER RESOLVED, that it shall be the specific function of this Commission to conduct a broad study, from the standpoint of the public interest, of the problems involved in the present relation of medicine to optometry, and to explore all possible and desirable solutions to these problems; and

BE IT FURTHER RESOLVED, that the Board of Trustees be requested to provide adequate personnel and funds for the proper performance of the duty assigned to this Commission, and

BE IT FURTHER RESOLVED, that this Commission shall report to the House of Delegates not later than June, 1962.

RESOLUTION V

WHEREAS, the medical profession often receives requests for information concerning previous disabilities of patients from various government agencies, especially the Veterans Administration, the Social Security Administration and the Civil Service Commission, and

WHEREAS, these agencies do not usually provide reimbursement for these services;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association contact the above named agencies and ask them to arrange for reimbursement to the physician for providing information they require, or that they inform the individual that payment on their part may be required.

RESOLUTION VI

WHEREAS, the 16th Annual Meeting of the Alaska State Medical Association is now meeting in Sitka, Alaska, and

WHEREAS, Dr. Benjamin E. McBrayer, President; Dr. Robert Shuler, Arrangements Chairman and his staff; Mayor J. Earl Shennett of Sitka; Dr. R. R. Armstrong, President, Sheldon Jackson Junior College; the Alaska Lumber and Pulp Company; the Sitka Daily Sentinel; radio stations KIFW and KSEW; television station KSATV and the Sitka Independent School District Board have all played a signifcant part in arranging for our entertainment, and

WHEREAS, the Alaska Heart Association and Pfizer Laboratories have provided two prominent speakers for the program;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association extends all of these their sincere thanks.

RESOLUTION VII

WHEREAS, Frederick H. Bentley, M.D., Portland, Oregon; James M. Burnell, M.D., University of Washington, Seattle, Washington; Clement Finch, M.D., University of Washington, Seattle, Washington; Robert Fraser, M.D., University of Alberta, Edmonton; Raymond M. McKeown, M.D., Coos Bay, Oregon; Alfred M. Popma, M.D., Boise, Idaho; Paul Rhoads, M.D., Editor, Archives of Internal Medicine, Chicago, Illinois; David L. Sparling, M.D., Tacoma, Washington; Lee Stevenson, M.D., Henry Ford Hospital, Detroit, Michigan; Ian Thompson, M.D., University of Missouri, Columbia, Missouri; and James A. Wilson, M.D., Ketchikan, Alaska, have read papers at the 16th Annual Meeting of the Alaska State Medical Association;

BE IT THEREFORE RESOLVED, that these speakers be made Honorary Members of the Alaska State Medical Association, excepting Dr. James A. Wilson of Ketchikan, Alaska, who is a Regular Members of this Association;

BE IT FURTHER RESOLVED, that the Alaska State Medical Association extend them and their sponsoring institutions and organizations a vote of thanks, and

BE IT FURTHER RESOLVED, that Alaska Medicine be urged to publish these papers in forthcoming issues for more thorough dissemination to the members of the Association who were unable to attend the meeting.

RESOLUTION VIII

WHEREAS, the Kerr-Mills Act providing for the medical care of the indigent elderly was passed into law by the U.S. Congress, and

WHEREAS, the Alaska State Medical Association supports the type of program called for in this legislation for the care of indigent elderly, and

WHEREAS the King-Anderson Bill now before Congress, in the opinion of the Alaska State Medical Association, is an ill-conceived and cynical piece of legislation providing for unwarranted interference in the practice of medicine by the Federal government, and not providing adequately for the professional and hospital services needed by the elderly segment of our population;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association urge the Alaska State Legislature to pass Kerr-Mills implementing legislation at the earliest possible time, and

BE IT FURTHER RESOLVED, that the Alaska State Medical Association actively oppose the King-Anderson Bill and similarly conceived legislation.

RESOLUTION IX

WHEREAS, Public Law No. 830, known as the Alaska Mental Health Act, passed by the U.S. Congress in 1956, provided for the transfer to the State of Alaska of 1,000,000 acres of land, and

WHEREAS, it was the clear intent of the law that all revenues derived from this land were to be used for the support of the Alaska Mental Health Program, and

WHEREAS, the Attorney General of the State of Alaska has ruled that funds derived from these lands shall be used for the Alaska Mental Health Program only to the extent of the current mental health budget, with complete disregard for the tremendous future needs of the program;

BE IT THEREFORE RESOLVED that the Alaska State Medical Association protest the ruling of the Attorney General of Alaska, and take all possible steps to see that this decision is reversed.

RESOLUTION X

WHEREAS, we understand that at the next annual meeting of the American Medical Association there will be proposed a model medical practice act;

BE IT THEREFORE RESOLVED, that the Council be asked to review the present Alaska Medical Practice Act and the AMA Model Act, and to draw up a proposed new Medical Practice Act for Alaska to be introduced at the 1962 legislative session if, in the opinion of the Legislative Committee, it is required.

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The meeting was then recessed, followed by the afternoon scientific session.

**Saturday, May 27, 1961**

The meeting was opened by President McBrayer, who called upon Dr. Wilson for additional resolutions from his committee. Eleven additional resolutions were presented. After being duly moved and seconded the following resolutions were passed unanimously:

RESOLUTION XI

WHEREAS, it is felt most important for the Alaska State Medical Association to be represented at the State Legislature, and

WHEREAS, a paid lobbyist would be able to spend a definite amount of time effectively representing our views;

NOW, THEREFORE, BE IT RESOLVED, that the Alaska State Medical Association, through the Legislative Committee, proceed to budget for, and hire such a representative.

RESOLUTION XII

WHEREAS, the former Alaska Department of Health has been absorbed into the Department of Health and Welfare, headed by a politically appointed commissioner, and

WHEREAS, at the 1959 Alaska State Medical Association meeting specific recommendations were made against this type of organization, for reasons outlined at that time, and

WHEREAS, experience during the past two years has shown that this departmental structure is not adequate for the needs of either of these divisions;

NOW, THEREFORE, BE IT RESOLVED, that the Alaska State Medical Association strongly recommends the formation of separate departments of Public Health and Mental Health, each with their own administrative boards and each to be headed by specifically qualified commissioners appointed by these boards.

RESOLUTION XIII

WHEREAS, an adequate mental health program requires adequate outpatient clinic facilities at least for the indigent patient and

WHEREAS, it has been the experience in other states that such clinics function more efficiently if controlled and financially supported at least in part by the community in which they are located;

NOW, THEREFORE, BE IT RESOLVED, that the Alaska State Medical Association supports any plan proposed by a community large enough to support it to set up a community mental health clinic financed partly by State and partly by local funds, and also would support any law to make such financing possible.

RESOLUTION XIV

WHEREAS, the present salaries of medical directors of Public Health and Mental Health have proved unrealistic in light of the failure to recruit qualified personnel, and

WHEREAS, in fact, present salaries are actually less than those received in other States by many county health officers;

NOW, THEREFORE, BE IT RESOLVED that the Division of Mental Health and Public Health be empowered to offer salaries comparable with those in other States.

RESOLUTION XV

WHEREAS, the free exchange of ideas is essential to the progress of science and medicine, and

WHEREAS, the movie has become a standard form of exchanging ideas and knowledge, and

WHEREAS, the Constitution guarantees the freedoms of meeting and exchanging ideas through speech, be it impromptu or recorded on film, and

WHEREAS, the commercial movie industry is essentially free of Federal regulation at the present time, and

WHEREAS, the FDA regulation of films distributed by drug houses is an infringement on the constitutional rights heretofore enumerated, and constitutes a start of Federal regulation where it is not needed, and

WHEREAS, the FDA was instituted to protect the people from impure and dangerous drugs, and not to regulate information disseminated to the physicians, and

WHEREAS, the deleterious effects of this arbitrary bureaucratic regulation were recently demonstrated when the Fairbanks Medical Association was deprived of its anticipated scientific program and stimulus to the better practice of medicine that should have been derived from said program had the FDA not prevented the arrival of the film while requiring the distributor to meet certain arbitrary regulations not even connected with the actual film itself;

NOW, THEREFORE, BE IT RESOLVED, that the Alaska State Medical Association censure the FDA for overstepping the boundaries of the intent for which it was established, requesting that it direct its full attention to the supervision of drugs only and save the taxpayers the expense of supervising films, allowing free, uncensored interchange of ideas and obviate the increased cost to the drug houses and thence to the patient by eliminating the present ill-proposed regulations of film distribution.

RESOLUTION XVI

WHEREAS, Dr. William M. Whitehead has been of great service to the Alaska State Medical Association since its organization, and

WHEREAS, this is the first annual Alaska State Medical Association meeting which, due to illness, he has been unable to attend;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association, in session assembled, convey to him by wire their best wishes for a speedy recovery, and their appreciation for the many years of faithful service to this organization in the many offices which he held.

RESOLUTION XVII

WHEREAS, the United States Public Health Service, Alaska Native Health Service, has recently modified their eligibility policy to provide medical care for the previously ineligible Native woman married to a non-Native man, and for their children, if the husband declares he is indigent, and

WHEREAS, the stated policy of the USPHS in Alaska is to encourage greater self-sufficiency in the

Native population, and to promote the eventual assumption of their medical care by the State, community, or the patient himself, and

WHEREAS, the Native health care policy in Alaska is unique, as all patients with a quarter or greater Native blood, regardless of income, are eligible for medical care, despite living off reservations, and having full citizenship rights;

BE IT THEREFORE RESOLVED that the Alaska State Medical Association urge the USPHS Native Health Service in Alaska to institute thorough social service screening to determine financial eligibility of Native dependents of non-Native men, and eventually of all Native Health Service beneficiaries.

RESOLUTION XIX

WHEREAS, as Alaskans, we are interested in promoting the tourist industry, and

WHEREAS, we recognize that associating with physicians from other areas broadens our outlook;

BE IT THEREFORE RESOLVED, that we recommend that efforts be made to publicize the Alaska State Medical Association conventions as a tourist attraction to medical societies in other States and countries.

RESOLUTION XVIII

WHEREAS, the Alaska State Legislature has passed a law authorizing the establishment of a mental health facility in Valdez through the expensive reconstruction of the Harborview Apartments, and

WHEREAS, the Alaska State Medical Association, through its Mental Health Committee, and through consultation by its members, both individually and collectively, with legislators and officials of the Alaska Department of Health and Welfare has thoroughly studied the Valdez proposal and found it an ill-conceived, poorly located, excessively expensive and impractical facility of the sort which should not continue to exist in our present state of enlightenment in the field of mental health;

BE IT THEREFORE RESOLVED that the Alaska State Medical Association go on record as opposing the establishment, activation and continued use of the Valdez Mental Health Facility, and

BE IT FURTHER RESOLVED, that the Alaska State Medical Association urge those with authority in the State government to consult with the Alaska State Medical Association, as well as recognized authorities in the psychiatric field, in planning future program in the mental health field in Alaska.

RESOLUTION XX

WHEREAS, recent decreases in pharmaceutical advertising in AMA publications has raised the need for a source of additional funds to support the AMA budget;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association support the AMA in its present plan to secure such funds by a dues increase of $20.00.

RESOLUTION XXI

WHEREAS the need for mental health care within Alaska has been recognized and initial phases of providing such care have been instituted, following much encouragement on the part of the Alaska State Medical Association, some of its component branches, the Alaska Mental Health Association, and other lay and professional groups, and

WHEREAS, in the 2½ years of Statehood the State government has shown a marked lack of knowledge of or interest in the increasingly severe mental health problems of the State, and

WHEREAS, in the first session of the 2nd Legislature a bill providing for a survey of Alaska's mental health problems by the American Psychiatric Association was not reported out of committee;

NOW, THEREFORE, BE IT RESOLVED that the Alaska State Medical Association strongly urges a comprehensive study of present mental health needs, either by the American Psychiatric Association, as proposed in the above bill, by WICHE, or by any other competent organization which would be acceptable to the Alaska State Medical Association.

RESOLUTION XXII

WHEREAS, we in the medical profession recognize and are concerned about the failure of the Native and part-Native peoples of Alaska to assume personal responsibility for their health and well-being even when financially capable of doing so, and

WHEREAS, the Federal and State governments appear to have no philosophical or practical plan for encouraging incentive to these peoples to become self-sufficient;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association recommends that a council be formed consisting of physicians, ministers, business men, Native leaders and educators, to make recommendations to the State and Federal governments in order to promote development of Alaskan Natives as self-sufficient and socially effective individuals.

Upon a motion from the floor by Dr. Robert D. Whaley, duly seconded and passed unanimously, the following was added to Resolution XXII:

BE IT FURTHER RESOLVED, that a committee be appointed by the President to initiate the establishment of such Council and that a moderate expenditure of funds be authorized.

RESOLUTION XXIII

WHEREAS, Dr. Milo H. Fritz has been of great service to the Alaska State Medical Association as Delegate to the American Medical Association since 1955, and

WHEREAS, Dr. Fritz has indicated that he is no longer able to devote the time required by this position;

BE IT THEREFORE RESOLVED, that the Alaska State Medical Association express its sincere appreciation for the services of Dr. Fritz in representing Alaska so well in the American Medical Association House of Delegates.

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President McBrayer then called for reports of committees:

**Committee on Aging:** Dr. C. E . Chenoweth, Chairman, presented the report of this committee, which was unanimously approved.

**Budget Commitee:** Dr. J. Ray Langdon (in the absence of the Chairman), presented the report and recommendations of the Budget Committee, which was unanimously approved.

**Committee on Voluntary Health Organizations:** Dr. Helen Whaley, Chairman, presented the report of this committee, which was unanimously approved.

**Industrial Accident Committee:** Dr. Henry G. Storrs, Chairman, presented the report of this committee, which was unanimously approved.

**Constitution and By-Laws Committee:** No report.

**Committee to Study Alaska Medical Practice Act:** No report.

**Committee to Study Patient Confidence Relationship:** No report.

**Committee to Study Possibility of Transfer of Alaska Native Health Services to the Alaska Department of Health and Welfare:** Dr. Robert D. Whaley (in the absence of the Chairman) presented the report of this commitee, which was unanimously approved.

**Alaska Medicine:** No report.

**School Health Committee:** No report.

**Mental Health Committee:** Dr. J. Ray Langdon (Chairman) presented the report of the Mental Health Committee, which was unanimously approved.

**Library Committee:** No report.

**Fee Schedule Committee:** Dr. Philip Moore, Chairman, presented the report of the Fee Schedule Committee, which was unanimously approved with suggested changes and recommendations.

**Legislative Committee:** No report.

**Committee on Vocational Rehabilitation:** Dr. Henry Wilde presented the report of the Committee on Vocational Rehabilitation, which was unanimously approved.

There being no further business to come before the meeting the President adjourned the meeting at 11:45 A.M.

# TOXICITY OF DRUGS IN THE NEWBORN

Recent dramatic and tragic clinical experience has demonstrated that infants may respond abnormally to doses of drugs which are well tolerated by older children and adults. There has been an increase in infant mortality in the United States from a low of 26/1000 from 1952-1956 to 26.9/1000, 1958. The reasons for these increases are not known, but the possibility that some of this increased mortality is iatrongenic has resulted in an extensive review of therapeutic practices employed in the management of the newborn and premature infants.

The temporary deficiencies in enzyme systtems, common to the normal newborn, are accentuated in prematures and responsible for many of these drug reactions. Biochemical immaturity of tissues and enzyme systems makes it invalid to calculate dosages by weight or body surface and to treat newborns as miniature adults.

**Chloramphenicol** has been found to involve glucuronide formation for its excretion. The so-called "gray syndrome" has resulted from doses of 100 mg/kg/day in full term infants and occasionally with 25 mg/kg/day in prematures, and has resulted in death. The "gray syndrome" consists of abdominal distention with or without emesis, occasional hypothermia, progressive pallor, cyanosis and vasomotor collapse, often with irregular respirations. This syndrome is believed to be due to prolonged contact with neural tissue of chloramphenicol, which is very slowly metabolized in the newborn. Dosages should not exceed 25 mg/kg/day in the premature nor 50 mg/kg/day for the full-term infant under one month of age.

**Sulfisoxazole** (Gantrisin) has been found to be associated with an increased incidence of kernicterus when used prophylactically against bacterial infection in the premature. The kernicterus may be related to a hemolytic effect of the drug, potentiation of the cytotoxic effect of bilirubin or competition with bilirubin for pathways of excretion. Sulfonamides should be used with caution, if at all, in newborns and should be avoided when jaundice is present. There is danger in giving them to the woman at term since they have been shown to cross the placenta, giving persistent blood levels for as long as five to six days in the infant.

**Vitamin K** is associated with an increased incidence of kernicterus in prematures, possibly due to a defective glucuronide transferase enzyme system so that the drug and bilirubin compete for the same enzyme, resulting in a high level of non-metabolized bilirubin in the neutral cells and consequently kernicterus. However, recent studies have also re-emphasized the importance of prophylactic administration of Vitamin K to decrease the frequency of hemorrhage in the new born. Instead of the excessive doses of water-soluble preparations of Vitamin K given in the past, a prophylactic oral dose of 10 mg to the mother no later than four hours before delivery is adequate. If the mother has not received the drug, the infant should receive a dose 1 to 2 mg parenterally. When treatment of hypoprothrombinemia of the newborn is required, Vitamin $K_1$ (Mephyton) in a parenteral dose not to exceed 10 mg is probably adequate.

**Short acting barbiturates:** The ultra short and short acting barbiturates are dangerously toxic for premature and even term newborns because of the prolonged action of the drug, due to inadequate metabolism by the liver, which may result in death. This is due to the absence of the microsome enzyme system of the liver which is necessary for the metabolism of other drugs such as ephedrine, meperidine, codeine, quinacrine, quinine, colchicine, amphetamine, acetanilid, aspirin, chlorpromazine hydrochloride and other phenothiazine agents. They should all be used with caution until more clinical evaluations have been done.

Abstracted from the articles by Dana, G. W., and McCawley, E. L.; GP 23:100 (Feb.) 1961 and Nyhan, William L.: The Journal of Pediatrics 59:1 (July) 1961.

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*Transatlantic Telephone Symposium, *The Effect of Estrogens in the Menopause,* Amsterdam/New York, 1959. Transcript available on request.
Published, J.M.A. Alabama 29:448 (May) 1960.

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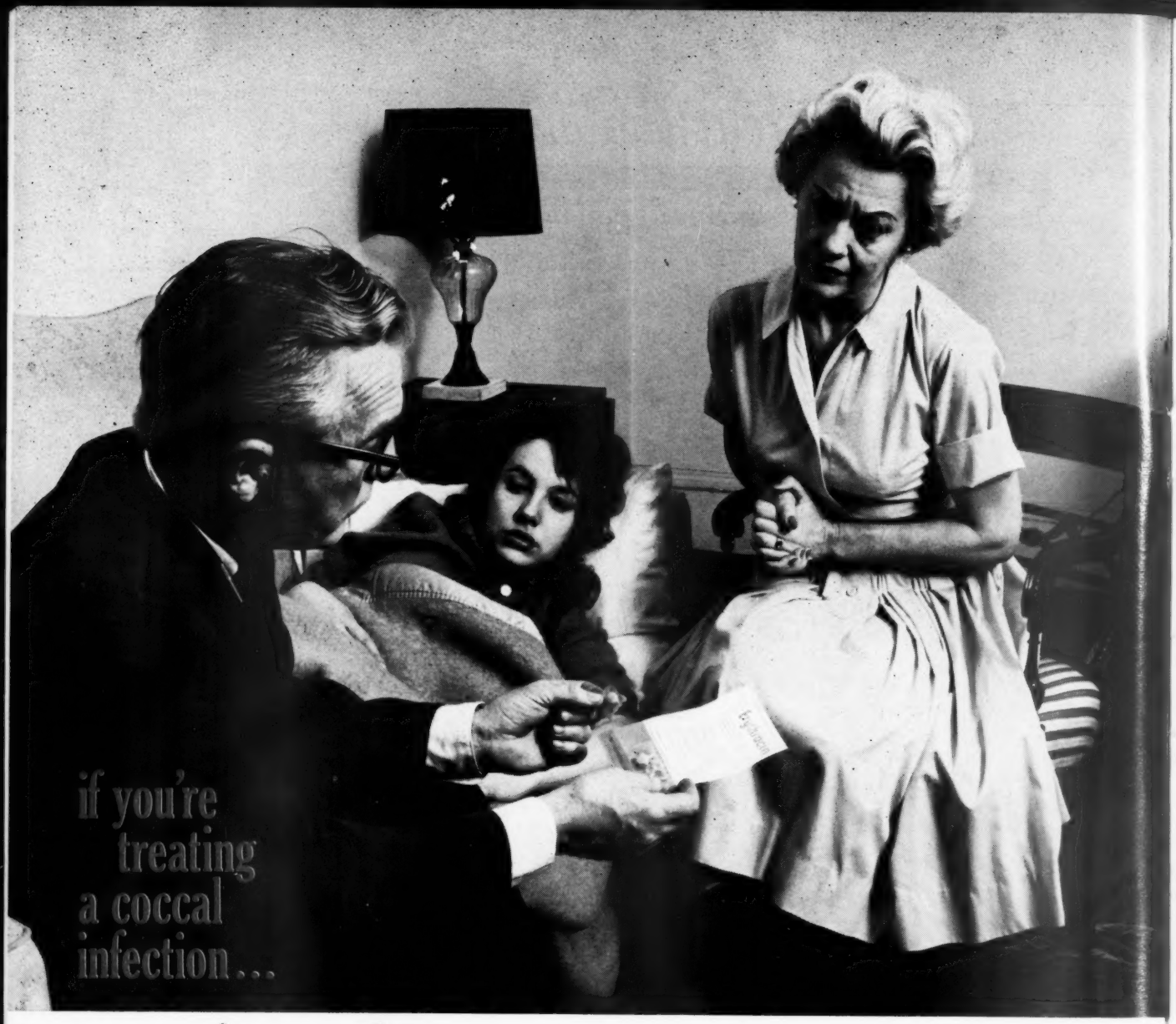


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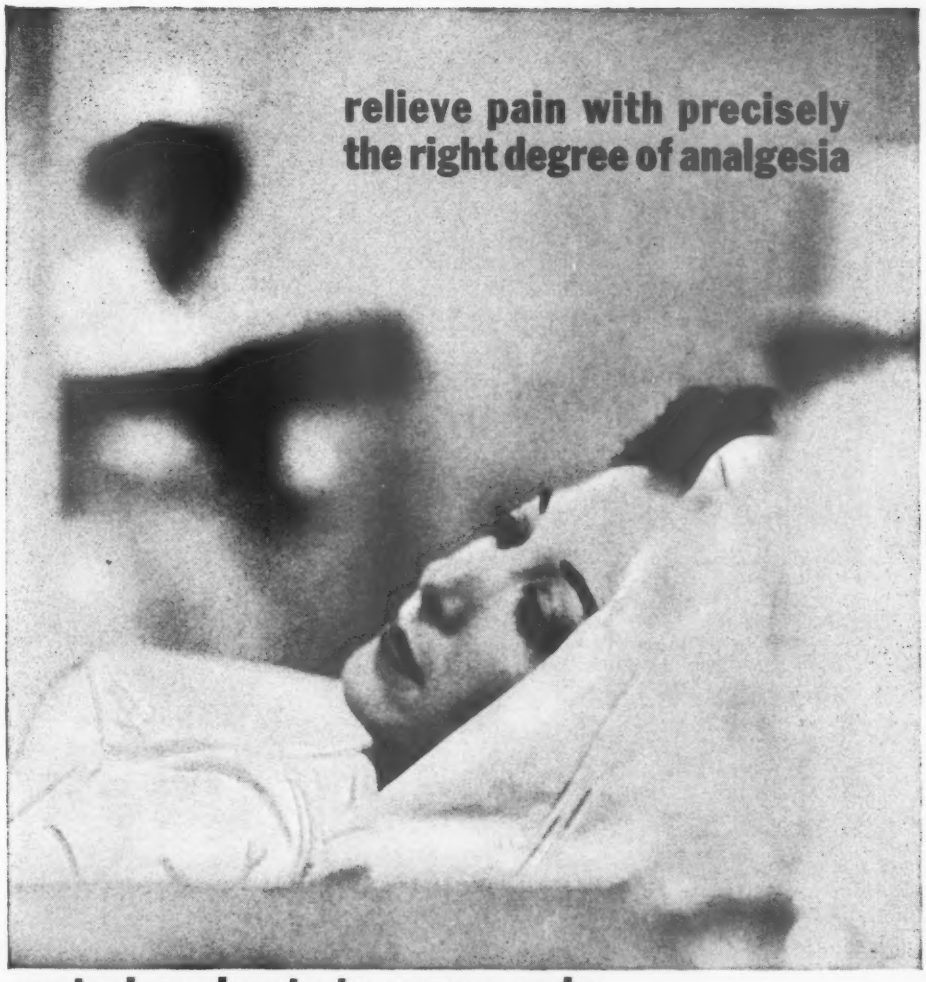


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'Empirin' Compound and 'Empirin' Compound with Codeine Phosphate products provide pinpoint control, anywhere along the pain scale, for all intensities up to that which requires morphine—without narcotic excess. For effective analgesic, antipyretic and antitussive action, prescribe the 'Empirin' Compound that suits your purpose best.

### 'Tabloid' 'EMPIRIN' COMPOUND*

| | |
|---|---|
| Acetophenetidin | gr. 2½ |
| Acetylsalicylic Acid | gr. 3½ |
| Caffeine | gr. ½ |

### 'Tabloid' 'EMPIRIN' COMPOUND® with CODEINE PHOSPHATE*

| | |
|---|---|
| No. 1 — Codeine Phosphate | gr. ⅛ |
| No. 2 — Codeine Phosphate | gr. ¼ |
| No. 3 — Codeine Phosphate | gr. ½ |
| No. 4 — Codeine Phosphate | gr. 1 |

*Subject to Federal Narcotic Regulations.

**BURROUGHS WELLCOME & CO. (U.S.A.) INC., Tuckahoe, New York**

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SPECIAL SHOES,
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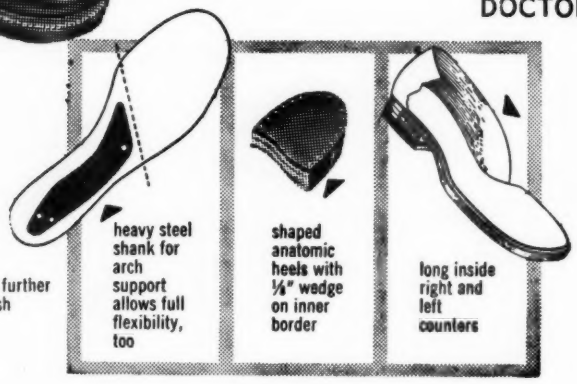
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shaped anatomic heels with ⅛" wedge on inner border
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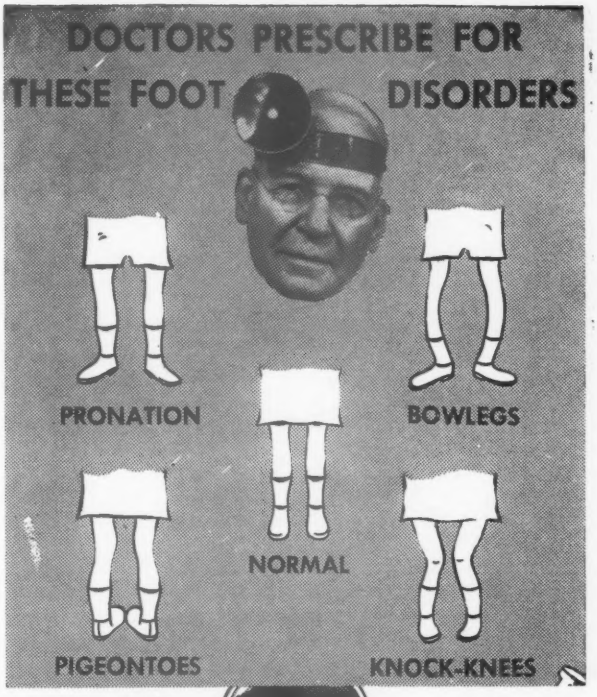


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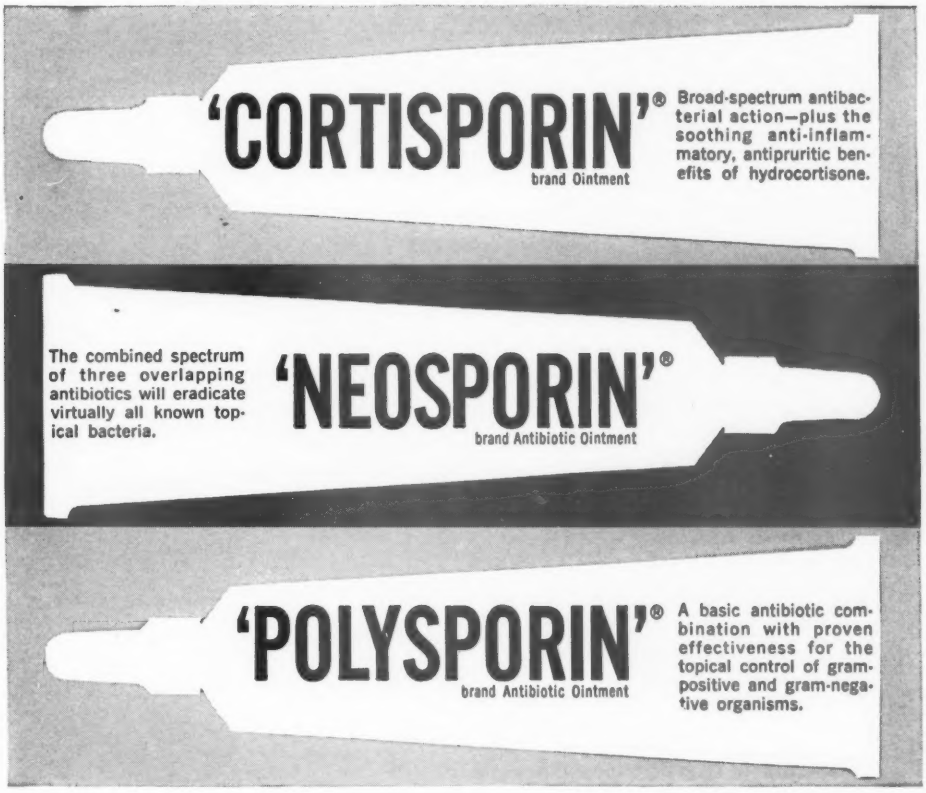
# 'B. W. & Co.' 'Sporin' Ointments rarely sensitize . . . give decisive bactericidal action for most every topical indication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| 'Aerosporin'® brand Polymyxin B Sulfate | 10,000 Units | 5,000 Units | 5,000 Units |
| Zinc Bacitracin | 500 Units | 400 Units | 400 Units |
| Neomycin Sulfate | — | 5 mg. | 5 mg. |
| Hydrocortisone | — | — | 10 mg. |
| Supplied: | Tubes of 1 oz., ½ oz. and ⅛ oz. (with ophthalmic tip) | Tubes of 1 oz., ½ oz. and ⅛ oz. (with ophthalmic tip) | Tubes of ½ oz. and ⅛ oz. (with ophthalmic tip) |

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## to "the under-par child"*

## NEW Zentron™

**comprehensive liquid hematinic**

- corrects iron deficiency
- restores healthy appetite
- helps promote normal growth

* underweight, easily fatigued, anorexic—due to mild anemia

*Each 5-cc. teaspoonful provides:*

| | | |
|---|---|---|
| Ferrous Sulfate (equivalent to 20 mg. of iron) | 100 | mg. |
| Thiamine Hydrochloride (Vitamin $B_1$) | 1 | mg. |
| Riboflavin (Vitamin $B_2$) | 1 | mg. |
| Pyridoxine Hydrochloride (Vitamin $B_6$) | 0.5 | mg. |
| Vitamin $B_{12}$ Crystalline | 5 | mcg. |
| Pantothenic Acid (as *d*-Panthenol) | 1 | mg. |
| Nicotinamide | 5 | mg. |
| Ascorbic Acid (Vitamin C) | 35 | mg. |

Alcohol, 2 percent.

Usual dosage:

*Infants and children*—1/2 to 1 teaspoonful (preferably at mealtime) one to three times daily.

*Adults*—1 to 2 teaspoonfuls (preferably at mealtime) three times daily.

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